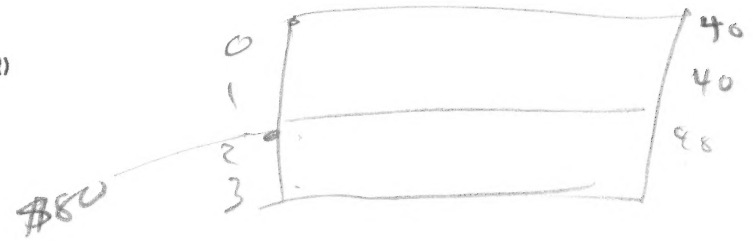
```
                LINK PP16.ASM
                ;-------------------------------------------------------------------------
                ;
                ;       PAINTER POWER ADVANCED - PP-16.652 - JUNE 11, 1981
                ;       COPYRIGHT (C) 1981 BY ERIC S. PODIETZ  D/B/A DIGITAL MERCURY
                ;
                ;       " Shall it ever carry the spirit of Channel Fifty Million "
                ;
                ;-------------------------------------------------------------------------
                ;
                ;
                ; HARDWARE TOGGLES
                ; ----------------
                ;
= C054          PRIMPG: EQU     $C054           ;DISPLAY PRIMARY PAGE
= C055          SECPG:  EQU     $C055           ;DISPLAY 2ND PAGE
= C051          TXTDSP: EQU     $C051           ;DISPLAY TEXT
= C057          DHIRES: EQU     $C057           ;DISPLAY HIRES GRAPHICS
= C050          DGRAPH: EQU     $C050           ;DISPLAY GRAPHICS
= C030          SPEAK:  EQU     $C030           ;APPLE SPEAKER
                ;
                ; APPLE SOFTWARE INTERFACE
                ; ------------------------
                ;
= 0024          CURSRX: EQU     $24             ;TEXT CURSOR POSITION
= 0025          CURSRY: EQU     $25
= FB1E          PREAD:  EQU     $FB1E           ;READ PADDLE
= FDF0          COUT1:  EQU     $FDF0           ;OUTPUT CHAR TO SCREEN
= FCA8          ADELAY: EQU     $FCA8           ;APPLE DELAY ROUTINE
= FF4A          IOSAVE: EQU     $FF4A           ;SAVE 6502 REGISTERS
= FF3F          IOREST: EQU     $FF3F           ;RESTORE 6502 REGISTERS
= FE84          SETNRM: EQU     $FE84           ;SET NORMAL TEXT MODE
= FC22          CURSET: EQU     $FC22           ;SET CURSOR POSITION (COMPUTE BASL/H)
= 0028          BASL:   EQU     $28             ;BASE ADDRESS OF CURSOR POSITION
= 0029          BASH:   EQU     $29
                ;
                ;
                ;    PAGE ZERO DEFINITIONS
                ;    ---------------------
                ;
= 0060          FROM:   EQU     $60             ;FROM LOCATION FOR COPYING
= 0062          TO:     EQU     $62             ;TO LOCATION FOR COPYING
                ;
= 0064          CPAGE1: EQU     $64             ;BEGINNING LOC OF TEXT LINES 20 & 21.
= 0066          CPAGE2: EQU     $66             ;BEGINNING LOC OF TEXT LINES 22 & 23.
                ;
= 0068          TBASEX: EQU     $68             ;TARGET PATTERN BASE  - X VALUES
= 006A          TBASEY: EQU     $6A             ;TARGET PATTERN BASE  - Y VALUES
= 006C          SBASEX: EQU     $6C             ;SOURCE PATTERN BASE -  X VALUES
= 006E          SBASEY: EQU     $6E             ;SOURCE PATTERN BASE  - Y VALUES
= 0070          CBASEX: EQU     $70             ;CURRENTLY DISPLAYED PATTERN BASE - X VALUES
= 0072          CBASEY: EQU     $72
= 0074          BBASEX: EQU     $74             ;STROKE BUFFER
= 0076          BBASEY: EQU     $76
                ;
```

```
                ; SPECIAL MEMORY LOCATIONS
                ; ------------------------
                ;
     = 03E8     REGS:   EQU     $03E8           ;LAST $18 LOCATIONS OF PAGE 3 ARE USED TO
                                                ;HOLD ZERO PAGE STUFF WHILE WE MESS AROUND.
                ;
                ;  MEMORY OFFSET VALUES (FROM CPAGE 1/2) FOR CONTROL DISPLAY.
                ;  ----------------------------------------------------------
                ;
     = 0000     TXLIN1  EQU     $00
     = 0080     TXLIN2  EQU     $80
                ;
     = 0001     TXUSD   EQU    TXLIN1+01       ;DISP BEING USED
     = 000C     TXBSE   EQU    TXLIN1+12       ;CURRENT BASE
     = 001C     TXTSZ:  EQU     TXLIN1+28       ;SIZE OF TARGET PATTTERN BEING USED
     = 0025     TXSSZ:  EQU     TXLIN1+37       ;SIZE OF SOURC PATTERN BEING USED
     = 008A     TXVER:  EQU     TXLIN2+10       ;VISUALIZE MODE
     = 0094     TXLOC:  EQU     TXLIN2+20       ;LOCATE MODE
     = 009E     TXFREZ  EQU    TXLIN2+30       ;FREEZE FLAG
     = 00A7     TXPNT:  EQU     TXLIN2+39       ;PAINT MODE (MASTER)
     = 000A     TXGST:  EQU     TXLIN1+10       ;QUICKSTROKE MODE
     = 0014     TXHLDX  EQU    TXLIN1+20       ;HOLD X FLAG
     = 0016     TXHLDY  EQU    TXLIN1+22       ;HOLD Y FLAG
     = 001E     TXCOLR  EQU    TXLIN1+30       ;CURRENT COLOR
     = 0027     TXDRWF  EQU    TXLIN1+39       ;DRAW ENABLE FLAG
     = 008A     TXWRP:  EQU     TXLIN2+10       ;WRAPAROUND FLAG
     = 0094     TXNEGX  EQU     TXLIN2+20       ;NEGATE SOURCE X VECTOR
     = 0096     TXNEGY  EQU     TXLIN2+22       ;NEGATE SOURCE Y VECTOR
     = 009E     TXMODE  EQU    TXLIN2+30       ;MAKE/DRAW MODE FLAG
     = 00A7     TXPNM   EQU     TXLIN2+39       ;PAINT APPLICATION MODE (!!)
                ;
                ;
0000 = 0C00             ORG $C00
                ;
0C00  D8        BEGIN:  CLD     ;SET BIN MODE
0C01  AD6A1F            LDA     INIFLG          ;ALREADY INITIALIZED?
0C04  D001 ^0C07        BNE     DOINI           ;NOPE
0C06  60                RTS
0C07  205B64    DOINI:  JSR     SAVREG          ;SAVE ZERO PAGE LOCATIONS
0C0A  A900              LDA     #0              ;CLEAR ERASE FLAG
0C0C  8D301F            STA     ERSFLG
0C0F  8D801F     STA HITTYP  ;SET HIT TYPE = EXTERNAL SO WE CAN GET AWAY
                    ;WITH ALL SORTS OF MONKEY BUSINESS.
0C12  8D841F            STA     KBFRCH          ;CLEAR FREEZE REINSTATE FLAG
0C15  8D851F            STA     QSTXEQ          ;CLEAR EXECUTING QUICKSTROKE FLAG
0C18  8D541F            STA     CUMODE          ;START OFF IN MASTER MODE
0C1B  8D9C1F            STA     SCSTRY+1        ;CLEAR OFF THE SCREEN BITS
0C1E  8D9A1F            STA     SCSTRX+1        ;FOR X/Y STARTING POINTS (10 BIT REGS)
0C21  8D911F            STA     TBSPTR          ;SET BASE POINTERS FOR BRUSH & QUICKSTROKE
0C24  8D921F            STA     BSPTR           ;BUFFERS TO BEGINNING OF PATTERN
0C27  A27F              LDX     #127
0C29  8C5D1F            STY     CSTRTX          ;START 'EM AT CENTER OF SCREEN
0C2C  8C991F            STY     SCSTRX
0C2F  A240              LDX     #64
0C31  8C5E1F            STY     CSTRTY
```



128
80
208

```
0C34  8C9B1F            STY     SCSTRY
0C37  20C417            JSR     GPAGE1          ;SET UP POINTERS TO CTL DISPLAY
0C3A  20041A            JSR     WRTEXT          ;WRITE TEXT AS TXTFLG ALLOWS
                ;
                ; NOW WE HAVE TO GET OPERATIONAL BY FORCING THE SETTING OF THE VARIOUS
                ; FLAGS ONE WAY OR THE OTHER. THEN WE CAN RETURN TO CALLER.
                ;
0C3D  A901              LDA     #1              ;SET PAINTING MODE TO NORMAL
0C3F  200A16            JSR     PNMHIT
0C42  209110            JSR     FRZON           ;PUT FREEZE ON
0C45  A94E              LDA     #'N'            ;TARGET SIZING MODE = NORMAL
0C47  8D3E1F            STA     XCHAR1
0C4A  202113            JSR     TRGMDE
0C4D  A94E              LDA     #'N'            ;STROKE SIZING MODE = NORMAL
0C4F  8D3E1F            STA     XCHAR1
0C52  205D13            JSR     SRCMDE
0C55  20F30F            JSR     RABBIT          ;START WITH SPEED 5
0C58  A94B              LDA     #'K'            ;COLOR SELECTION IS BY KB
0C5A  8D3E1F            STA     XCHAR1
0C5D  205B0F            JSR     COLMDE
0C60  A933              LDA     #'3'            ;START W/ WHITE BKGND
0C62  8D3E1F            STA     XCHAR1
0C65  200D10            JSR     CHBKND
0C68  A906              LDA     #6              ;SET PAINT COLOR TO BLACK
0C6A  20790F            JSR     COLCHG
0C6D  A931              LDA     #'1'            ;BRUSH #1
0C6F  8D5A1F            STA     CTARG
0C72  A950              LDA     #'P'            ;STROKE = PADDLES
0C74  8D5C1F            STA     CSOURC
0C77  207E17            JSR     RSET1           ;SET UP TARGET, SOURCE & STROKE BUFFERS
0C7A  A209              LDX     #9              ;NOW CHECK ALL 9 PATTERNS TO MAKE SURE
0C7C  ADA71F            LDA     APATTS          ;THERE ARE NONE W/0 POINTS. IF WE FIND
0C7F  8560              STA     FROM            ;ANY, THEN CHANGE # POINTS TO 20.
0C81  ADA81F            LDA     APATTS+1
0C84  8561              STA     FROM+1
0C86  A0FF              LDY     #$FF
0C88  B160      INPLOP: LDA     [FROM],Y
0C8A  D004 ^0C90        BNE     INPLOK
0C8C  A914              LDA     #20
0C8E  9160              STA     [FROM],Y
0C90  E661      INPLOK: INC     FROM+1          ;SKIP TO NEXT PATTERN BUFFER
0C92  E661              INC     FROM+1
0C94  CA                DEX
0C95  D0F1 ^0C88        BNE     INPLOP
0C97  207312            JSR     XTRNOF          ;X & Y HOLD OFF
0C9A  208912            JSR     YTRNOF
0C9D  208010            JSR     DTRNOF          ;TURN BRUSH OFF (LIFT)
0CA0  206710            JSR     DRAWNW          ;TURN MAKE MODE OFF
0CA3  202911            JSR     QSTOFF          ;QUICK STROKE OFF
0CA6  20C712            JSR     XNEGOF          ;NEGATE X & Y OFF
0CA9  200D13            JSR     YNEGOF
0CAC  204A11            JSR     LOCOFF          ;LOCATE MODE OFF
0CAF  20D710            JSR     VEROFF          ;VISUALIZE MODE OFF
0CB2  20EA10            JSR     WRPON           ;WRAPAROUND OFF
0CB5  20BF10            JSR     PNPNOF          ;TURN PAINT OFF (BRUSH ON - MONITOR)
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```
0CB8  A231            LDX    #'1'
0CBA  8A        TABLOP: TXA
0CBB  48                PHA
0CBC  8D3E1F            STA    XCHAR1          ;ASCII CHAR TYPED
0CBF  290F              AND    #$0F
0CC1  8D3F1F            STA    XCHAR2          ;COLOR NUMBER
0CC4  20BA0F            JSR    COLTAB
0CC7  68                PLA
0CC8  AA                TAX
0CC9  E8                INX
0CCA  C938              CMP    #'8'
0CCC  D0EC ^0CBA        BNE    TABLOP
0CCE  A900              LDA    #0
0CD0  8D6A1F            STA    INIFLG          ;WE'RE OFF AND RUNNING !
0CD3  20D316            JSR    DOFLGS          ;DISPLAY FLAGS IN CTL DISPLAY
0CD6  206D64            JSR    RSTREG
0CD9  60                RTS                    ;INITIALIZATION COMPLETE
                ;
                ;
                ;
0CDA  206E1C    COMAND: JSR    LSTERA
0CDD  20D710            JSR    VEROFF       ;TURN VERIFY OFF
0CE0  20BF10            JSR    PNPNOF       ;TURN PAINT OFF
0CE3  208010            JSR    DTRNOF       ;TURN BRUSH OFF
0CE6  209110            JSR    FRZON        ;TURN FREEZE ON
0CE9  A901              LDA    #$1          ;LOAD UP REMOTE CONTROL COUNTERS SO THAT WE
0CEB  8D011F            STA    REMTMP          ;AUTOMATICALLY EXIT TO CALLING PROGRAM WHEN
0CEE  8D611F            STA    HCOUNT          ;MAKE SURE EXIT IS TIMELY
0CF1  A900              LDA    #0
0CF3  8D021F            STA    RCTR1           ;THE COUNTERS ARE CHECKED AT NOHIT:
0CF6  8D031F            STA    RCTR2           ;REENTRY WILL BE THRU REENT.
0CF9  8D041F            STA    RCTR3
0CFC  60                RTS
                ;
0CFD  AD                DB     $AD ;==FLAK
                ;
                ;    REENT - COME HERE WHEN COMING BACK FROM BASIC
                ;            ASSUMPTION IS THAT HI-RES SCREENS ARE STILL INTACT.
                ;
0CFE  205B64    REENT:  JSR    SAVREG
0D01  206217            JSR    RSETUP          ;SET THINGS UP TO BE THE WAY THEY WERE
0D04  4C490D            JMP    LOOP            ;BEFORE WE WENT TO COMMAND MODE.
                ;
                ;   AND HERE WE GO
                ;
                ;    ==============
                ;    EXTERNAL CALLS
                ;    ==============
                ;
                ;    EXTCAL - PROCESS A SOFTWARE KB HIT
                ;    ----------------------------------
                ;
0D07  205B64    EXTCAL: JSR    SAVREG          ;THIS IS A CALL FROM THE OUTSIDE WORLD
0D0A  AD3D1F            LDA    TMPNUM          ;GET CHARACTER AS IF HIT FROM KB
0D0D  48                PHA
```

```
0D0E  207E17          JSR   RSET1          ;ESTABLISH 0 PAGE LOCATIONS USED
0D11  68              PLA
0D12  20190D          JSR   EXTCL1
0D15  206D64          JSR   RSTREG         ;RESTORE REGISTES
0D18  60              RTS
                ;
0D19  297F      EXTCL1: AND   #$7F          ;HACK OUT PARITY BIT
0D1B  8D3D1F          STA   TMPNUM
0D1E  8D7E1F          STA   TEMP
0D21  48              PHA
0D22  A900            LDA   #0
0D24  8D801F          STA   HITTYP         ;HIT TYPE = EXTERNAL (NOT KB)
0D27  68              PLA
0D28  20840D          JSR   STILUS         ;PROCESS IT
0D2B  60              RTS
                ;
                ;    MLTCAL - EXTERNAL REQUEST W/MULTIPLE KB HITS
                ;    ---------------------------------------------
                ;
0D2C  205B64    MLTCAL: JSR   SAVREG
0D2F  207E17          JSR   RSET1          ;SET UP 0 PAGE LOCATIONS
0D32  A000            LDY   #0
0D34  98        EXTLOP: TYA
0D35  48              PHA                  ;SAVE CURRENT POINTER TO EXTERNAL KB HIT
0D36  B90078          LDA   EXTTBL,Y       ;GET KB HIT
0D39  F009 ^0D44      BEQ   DONEXT         ;0 IS END MARKER
0D3B  20190D          JSR   EXTCL1         ;PROCESS IT
0D3E  68              PLA
0D3F  A8              TAY
0D40  C8              INY                  ;POINT TO NEXT CHAR
0D41  4C340D          JMP   EXTLOP
0D44  68        DONEXT: PLA
0D45  206D64          JSR   RSTREG
0D48  60              RTS
                ;
                ;    ============================
                ;        MAIN PROGRAM LOOP
                ;    ============================
0D49  A900      LOOP:   LDA   #0             ;SET CHRHIT SUCH THAT CALLING ROUTINE WILL
0D4B  8D401F          STA   CHRHIT         ;TELL IT FROM ASCII CHAR IN CASE WE TIME OUT.
0D4E  8D801F          STA   HITTYP         ;SET HIT TYPE = EXTERNAL
0D51  AD00C0          LDA   $C000          ;KB HIT?
0D54  104B ^0DA1      BPL   NOHIT          ;NOPE
0D56  205C0D          JSR   YESHIT         ;PROCESS IT
0D59  4CA10D          JMP   NOHIT
                ;
0D5C  297F      YESHIT: AND   #$7F          ;CAN THE PARITY BIT
0D5E  8D3D1F          STA   TMPNUM         ;KEEP DA CHAR
0D61  8D7E1F          STA   TEMP           ;KEEP IT HERE,TOO
0D64  8D401F          STA   CHRHIT         ;SAVE FOR EXTERNAL CALLER
0D67  AD10C0          LDA   $C010          ;KILL KB FLAG
0D6A  AD851F          LDA   QSTXEQ         ;DURING EXECUTION OF A QUICKSTROKE, IGNORE
0D6D  F003 ^0D72      BEQ   YESOK          ;ALL KB HITS
0D6F  4C490D          JMP   LOOP
0D72  20D864    YESOK:  JSR   SOUND2         ;ACKNOWLEDGE HIT WITH 'BIP'
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```
0D75  EE801F            INC     HITTYP          ;SET HIT TYPE = KB
0D78  AD811F            LDA     HITFLG          ;HOW ARE WE SUPPOSED TO RESPOND?
0D7B  3020 ^0D9D        BMI     NOACT           ;IGNORE ALL KB HITS.
0D7D  F005 ^0D84        BEQ     STILUS          ;RESPOND NORMALLY
0D7F  A90D              LDA     #$0D            ;RETURN TO USER - FAKE A CARRIAGE RETURN
0D81  8D7E1F            STA     TEMP
0D84  AD7E1F      STILUS: LDA     TEMP            ;GET CHARACTER BACK
0D87  E961              SBC     #$61            ;SUBTRACT 97 DECIMAL
0D89  3003 ^0D8E        BMI SM97
0D8B  4C9D0D            JMP     NOACT           ;IGNORE ) 96
0D8E  AD7E1F      SM97:   LDA     TEMP            ;ADD TWICE TO
0D91  6D7E1F            ADC     TEMP            ;OFFSET INTO ADDRESS TABLE
0D94  8D9F0D            STA     JMPLO           ;STORE OFFSET
0D97  AD3D1F            LDA     TMPNUM          ;GET BACK A SINGLE COPY
0D9A  209E0D            JSR     JMPIND          ;MAKE IT INTO  SUBROUTINE
                  ;                             ;INDIVIDUAL SUBROUTINES' RETURNS WILL
                  ;                             ;GET CONTROL BACK HERE
0D9D  60          NOACT:  RTS                     ;RETURN FROM HIT PROCESSING
                  ;
                  ;
0D9E  6C          JMPIND: DB $6C ;JMP INDIREC
0D9F  0063        JMPLO DW JMPTBL
                  ;
0DA1  CE611F      NOHIT:  DEC     HCOUNT          ;SEE IF IT'S TIME TO DRAW/ENTER YET
0DA4  CE5F1F            DEC     CCOUNT          ;OUR PADDLE READ INDICATOR
0DA7  AD5F1F            LDA     CCOUNT
0DAA  2903              AND     #3               ;SET TO READ PADDLE 0-3.
0DAC  20D417            JSR     GETPAD          ;READ PADDLES & SCALE
0DAF  200618            JSR     APLOC           ;APPLY LOCALLY
0DB2  20C918            JSR     GETVEC          ;APPLY TO REGISTERS & INTEGRATE W/STUFF FROM
                                                ;PRIOR KB HITS, COMING OUT WITH BUSEX, BUSEY.
0DB5  206519            JSR     SAVVEC          ;SAVE VECTOR IN STROKE BUFFER IF IN VERIFY.
                                                ;GET VECTOR FROM STROKE BUFFER IF DOING A QUICK
                                                ;OTHERWISE JUST PASS ON BUSEX & BUSEY.
0DB8  AD611F            LDA     HCOUNT
0DBB  F01B ^0DD8        BEQ     CNTOVR          ;COUNT IS UP
0DBD  AD7F1F      LFRZ0:  LDA     CHGFLG          ;ANY CHANGES FROM LAST TIME?
0DC0  F003 ^0DC5        BEQ     NOCHG0          ;NOPE
0DC2  206E1C            JSR     LSTERA          ;YES, WE HAVE TO ERASE
0DC5  AD301F      NOCHG0: LDA     ERSFLG          ;IF ERASE FLAG ON, THEN LEAVE IT UP THERE.
0DC8  3003 ^0DCD        BMI     RELOPY
0DCA  20CA1C            JSR     DRAWIT          ;PUT IT UP THERE IN NEW FORM.
0DCD  A900        RELOPY: LDA     #0              ;CLEAR CHANGE FLAG
0DCF  8D7F1F            STA     CHGFLG
0DD2  20121B       JSR BASDSP
0DD5  4C490D            JMP     LOOP
                  ;
0DD8  AD601F      CNTOVR: LDA     CURCNT          ;RESTORE COUNTER
0DDB  8D611F            STA     HCOUNT
0DDE  AD851F            LDA     QSTXEQ          ;EXECUTING QUICKSTROKE?
0DE1  D02E ^0E11        BNE     LPOK            ;IF SO, DON'T DECR OR CHECK COUNTERS
0DE3  AD011F            LDA     REMTMP          ;UNDER REMOTE CONTROL OR MAKING EXIT?
0DE6  F01F ^0E07        BEQ     NOREM           ;NOPE
0DE8  AD041F            LDA     RCTR3
0DEB  D017 ^0E04        BNE     DECR3
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0DED  AD031F            LDA     RCTR2
0DF0  D00F ^0E01        BNE     DECR2
0DF2  AD021F            LDA     RCTR1
0DF5  D007 ^0DFE        BNE     DECR1
0DF7  206E1C            JSR     LSTERA          ;ERASE LAST BEFORE LEAVING
0DFA  206D64            JSR     RSTREG          ;COUNTERS ARE EXHAUSTED, LET'S RETURN
0DFD  60                RTS
                ;
0DFE  CE021F    DECR1:  DEC     RCTR1
0E01  CE031F    DECR2:  DEC     RCTR2
0E04  CE041F    DECR3:  DEC     RCTR3
0E07  AD891F    NOREM:  LDA     ORGFLG          ;GOING BACK TO ORIGIN (ENTER)?
0E0A  D005 ^0E11        BNE     LPOK
0E0C  AD671F            LDA     FRZFLG
0E0F  10AC ^0DBD        BPL     LFRZ0           ;WE'RE FROZEN, GO NO FURTHER.
0E11  EE071F    LPOK:   INC     TCTR3
0E14  D008 ^0E1E        BNE     NORREM
0E16  EE061F            INC     TCTR2
0E19  D003 ^0E1E        BNE     NORREM
0E1B  EE051F            INC     TCTR1
                ;
0E1E  AD851F    NORREM: LDA     QSTXEQ          ;IF WE'RE DOING A QSTROKE, BRANCH ACCORDING TO
0E21  F007 ^0E2A        BEQ     LPNQST          ;WHETHER WE'RE ENTERING OR MOVING.
0E23  AD691F    MECHEK: LDA     MEFLAG
0E26  102B ^0E53        BPL     ENTER           ;ENTERING
0E28  D017 ^0E41        BNE     ADDVEC          ;MOVING
0E2A  AD891F    LPNQST: LDA     ORGFLG          ;IF RE-ORIGINATING IN ENTER.
0E2D  D024 ^0E53        BNE     ENTER
0E2F  AD6D1F            LDA     VISFLG          ;VISUALIZING?
0E32  3008 ^0E3C        BMI     LPNTVI          ;NO
0E34  AD6B1F            LDA     LOCFLG          ;IS LOCATE ALSO ON? IF SO, THEN WE WANT TO MOVE
0E37  1008 ^0E41        BPL     ADDVEC          ;AS OPPOSED TO JUST DRAWING THE STROKE.
0E39  4CC70E            JMP     DRAWER          ;JUST DRAW IT.
0E3C  AD691F    LPNTVI: LDA     MEFLAG
0E3F  1012 ^0E53        BPL     ENTER
                ;
0E41  AD441F    ADDVEC: LDA     USEX
0E44  8D3B1F            STA     TEMPX
0E47  AD451F            LDA     USEY
0E4A  8D3C1F            STA     TEMPY
0E4D  208A16            JSR     MOVSTT          ;MOVE STARTING POINT BY (TEMPX,TEMPY)
0E50  4CC70E            JMP     DRAWER
0E53  AD441F    ENTER:  LDA     USEX             ;DON'T ALLOW 'EM TO ENTER (0,0)
0E56  0D451F            ORA     USEY
0E59  F06C ^0EC7        BEQ     DRAWER
0E5B  206E1C            JSR     LSTERA           ;ERASE IF SUPPOSED TO
0E5E  AC571F            LDY     TPTR
0E61  F007 ^0E6A        BEQ     ENTNOK           ;SEE IF WE'RE STARTING/BACK TO 0 PTS.
0E63  CC2A1F            CPY     MAXPTS
0E66  F012 ^0E7A        BEQ     IZOKAY
0E68  9010 ^0E7A        BCC     IZOKAY
0E6A  AD6B1F    ENTNOK: LDA     LOCFLG          ;AVOID MANY BLEEPS IF IN LOCATE
0E6D  100B ^0E7A        BPL     IZOKAY
0E6F  207B14            JSR     ESORGE          ;REESTABLISH PATTERN ORIGIN
0E72  A000              LDY     #$0             ;MAX PATTERN LENGTH EXCEEDED, START OVER
```

```
0E74  8C571F            STY    TPTR
0E77  8C911F            STY    TBSPTR
0E7A  AE441F    IZOKAY: LDX    USEX
0E7D  AD6B1F            LDA    LOCFLG          ;WE HAVE TO SEE IF WE'RE 'L'OCATING NEXT PT.
0E80  3012 ^0E94        BMI    ENTNAD          ;NOPE
0E82  AD451F            LDA    USEY            ;GET Y VECTOR
0E85  88                DEY                    ;BACK UP TO WHAT IS LAST VECTOR THAT COUNTS.
0E86  18                CLC
0E87  716A              ADC    [TBASEY],Y      ;ADD OUR CURRENT VECTOR TO IT.
0E89  916A              STA    [TBASEY],Y
0E8B  8A                TXA
0E8C  18                CLC
0E8D  7168              ADC    [TBASEX],Y
0E8F  9168              STA    [TBASEX],Y
0E91  4C9C0E            JMP    ENTCKL
0E94  AD451F    ENTNAD: LDA    USEY
0E97  916A              STA    [TBASEY],Y
0E99  8A                TXA
0E9A  9168              STA    [TBASEX],Y
0E9C  C8        ENTCKL: INY
0E9D  8C571F            STY    TPTR
0EA0  AD8E1F            LDA    EORGX           ;NOW ADD THE CURRENT VECTOR TO THE VECTOR THAT
0EA3  38                SEC
0EA4  ED441F            SBC    USEX            ;WILL BE REQUIRED TO GET US BACK TO OUR ORIGIN
0EA7  8D8E1F            STA    EORGX
0EAA  AD8F1F            LDA    EORGY
0EAD  38                SEC
0EAE  ED451F            SBC    USEY
0EB1  8D8F1F            STA    EORGY
0EB4  AD651F            LDA    TAMFLG          ;NOW CHECK OUT TARGET SIZING MODE
0EB7  3003 ^0EBC        BMI    IZNLCK          ;ISN'T IN LOCK MODE
0EB9  AC2A1F            LDY    MAXPTS          ;PATTERN LENGTH AND
0EBC  8C2B1F    IZNLCK: STY    NUMPTS          ;# POINTS DISPLAYED = MAX LENGTH IF IN LOCK.
0EBF  98                TYA
0EC0  A0FF              LDY    #$FF
0EC2  9168              STA    [TBASEX],Y      ;UPDATE INHERENT PATTERN LENGTH AS WELL.
0EC4  20AD1B            JSR    TSZDSP          ;DISPLAY # PTS
                ;
0EC7  206E1C    DRAWER: JSR    LSTERA          ;ERASE LAST THING WE DISPLAYED
0ECA  20CA1C            JSR    DRAWIT          ;AND DRAW ANEW
0ECD  AD541F            LDA    CUMODE
0ED0  D019 ^0EEB        BNE    RELOOP          ;NOT PICTURE (MASTER) MODE
0ED2  AD6B1F            LDA    LOCFLG          ;IF LOCATE OR VISUALIZE IS ON, THEN IGNORE STAT
0ED5  1014 ^0EEB        BPL    RELOOP
0ED7  AD6D1F            LDA    VISFLG          ;OF BRUSH ON/OFF.
0EDA  100F ^0EEB        BPL    RELOOP          ;ONE OF THEM IS ON.
0EDC  ADA21F            LDA    OFFLAG          ;IF WE'RE OFF SCREEN, THEN WE WON'T LEAVE
0EDF  F00A ^0EEB        BEQ    RELOOP          ;ANY TRAILS BEHIND.
0EE1  AD681F            LDA    DRWFLG          ;IS BRUSH UP OR DOWN?
0EE4  3005 ^0EEB        BMI    RELOOP          ;UP
0EE6  A900              LDA    #0              ;DOWN, WE WON'T HAVE TO ERASE IT.
0EE8  8D301F            STA    ERSFLG          ;CLEAR 'HAVE TO ERASE' FLAG.
0EEB  A900      RELOOP: LDA    #0              ;CLEAR 'HAVE CHANGED' FLAG
0EED  8D7F1F            STA    CHGFLG
0EF0  8D891F            STA    ORGFLG          ;CLEAR 'O'RIGINATING FLAG
```

```
0EF3  ADA11F          LDA     PTCNT           ;NOW SET OFF SCREEN FLAG = 0 IF NO PTS WERE
0EF6  8DA21F          STA     OFFLAG          ;DRAWN ON SCREEN LAST TIME.
0EF9  AD841F          LDA     KBFRCH          ;NOW SEE IF WE'RE SUPPOSED TO REINSTITUTE THE F
0EFC  F008 ^0F06      BEQ     LPNKFR          ;NOPE
0EFE  A900            LDA     #0
0F00  8D841F          STA     KBFRCH
0F03  4C0D0F          JMP     LPFRZ
0F06  AD621F      LPNKFR: LDA     CSPEED          ;SINGLE STEP?
0F09  C953            CMP     #'S'
0F0B  D003 ^0F10      BNE     NOFRZZ          ;NO
0F0D  209110      LPFRZ:  JSR     FRZON           ;TURN FREEZE BACKON
0F10  4C490D      NOFRZZ: JMP     LOOP            ;AND ON AND ON AND ON...
                  ;
                  ;
                  ;
                  ;*************************************************************************
                  ;
0F13  5041494E54          DB      'PAINTER POWER'
0F20  20434F5059          DB      ' COPYRIGHT (C) 1981 BY ERIC S. PODIETZ '
0F47  5345524941   DB 'SERIAL # A-00524'
                  ;
                  ;*************************************************************************
                  ;
                  ;
                  ;
                  ;==================================
                  ; FOLLOWING ARE THE KB HIT
                  ; HANDLING ROUTINES.
                  ;==================================
                  ;
                  ;
                  ; NONFUN: NON-FUNCTIONAL KEY HIT - JUST RETURN
                  ; ---------------------------------------
                  ;
0F57  20D064      NONFUN: JSR     SOUND           ;BELCH AT 'EM
0F5A  60                RTS
                  ;
                  ;
                  ; COLMDE - CHANGE COLOR SELECTION MODE (KB OR PDL(1-4))
                  ; ------------------------------------------------
                  ;
0F5B  AD801F      COLMDE: LDA     HITTYP
0F5E  F003 ^0F63      BEQ     COLMOK
0F60  4CD064          JMP     SOUND           ;KB HIT - NO GOOD, USER
0F63  AD3E1F      COLMOK: LDA     XCHAR1
0F66  8D771F            STA     DSCLFG          ;UPDATE DISPLAY FLAG
0F69  C94B              CMP     #'K'            ;IS IT KEY BOARD
0F6B  D006 ^0F73        BNE     COLMNK
0F6D  A900              LDA     #0
0F6F  8D761F            STA     COLFLG
0F72  60                RTS
0F73  2907        COLMNK: AND     #$07
0F75  8D761F            STA     COLFLG
0F78  60                RTS
```

```
                        ;
                        ; COLCHG - PROCESS CHANGE IN PAINT COLOR
                        ; ---------------------------------
                        ;
0F79  AC761F    COLCHG: LDY     COLFLG          ;BELCH IF COLOR CONTROL IS PADDLES
0F7C  F004 ^0F82        BEQ     COLCKB
0F7E  20D064            JSR     SOUND
0F81  60                RTS
                        ;
0F82  290F      COLCKB: AND     #$0F            ;HACK OUT ASCII
0F84  8D7A1F            STA     BCOLOR          ;SAVE IN BACK-UP COLOR
0F87  09B0              ORA     #$B0            ;MAKE IT ASCII IF IT WASN'T
0F89  8D7B1F            STA     DSCOLR          ;FORM CHARACTER FOR CTL DISPLAY
0F8C  A01E              LDY     #TXCOLR
0F8E  20BA17            JSR     DPAGE2
0F91  AD541F            LDA     CUMODE          ;NOW: IF WE'RE IN MONITOR, DON'T PHYSICALLY
0F94  D022 ^0FB8        BNE     CGPNOF          ;IMPLEMENT THE COLOR CHANGE. WAIT.
0F96  AD7A1F            LDA     BCOLOR
                        ;
                        ; COLCH2 IS ENTRY POINT FOR WHEN WE WANT TO CHANGE ONLY COLOR DISPLAYED, BUT
                        ; NOT BACK-UP COLOR. THIS ENTRY IS USED WHEN SETTING MONITOR MODE.
                        ;
0F99  290F      COLCH2: AND     #$0F
0F9B  8D781F            STA     CCOLOR          ;UPDATE CURRENT COLOR DISPLAYED
0F9E  AA                TAX
0F9F  BD071F            LDA COLORS-1,X
                        ;         ;GET A COLOR
                        ;         ;CODE FOR 1-8
0FA2  8D411F            STA HCOLOR    ;NEW COLOR !
0FA5  8D421F            STA     HCOLR2          ;NOW WE HAVE TO SHIFT IT FOR DISPLAY OF
0FA8  0A                ASL     A                     ODD BYTES.
0FA9  C9C0              CMP     #$C0
0FAB  1008 ^0FB5        BPL     RTS1
0FAD  AD421F            LDA     HCOLR2
0FB0  497F              EOR     #$7F
0FB2  8D421F            STA     HCOLR2
0FB5  206E1C    RTS1:   JSR     LSTERA          ;ERASE WHAT WE DREW IN OLD COLOR
0FB8  60        CGPNOF: RTS
                        ;
0FB9  AD                DB      $AD ;==FLAK
                        ;
                        ; COLTAB - UPDATE COLOR LOOKUP TABLE (CALLED BY SET-UP MENU)
                        ; ---------------------------------------------------
                        ;
0FBA  AE801F    COLTAB: LDX     HITTYP
0FBD  F003 ^0FC2        BEQ     COLTOK
0FBF  4CD064            JMP     SOUND
0FC2  AE3F1F    COLTOK: LDX     XCHAR2          ;GET COLOR # WE'RE ON
0FC5  AD3E1F            LDA     XCHAR1          ;GET ASCII CHARACTER HIT (1-8)
0FC8  9D0F1F            STA     ACLOOK-1,X      ;STORE IN ASCII
0FCB  290F              AND     #$0F
0FCD  9D171F            STA     DCLOOK-1,X      ;STORE FOR INTERNAL USE
0FD0  206E1C            JSR     LSTERA          ;ERASE, SINCE THIS LITTLE CHANGE HERE
0FD3  60                RTS                     ;COULD AFFECT CURRENT COLOR.
                        ;
```

```
                        ;
                        ; UPDSPD - UPDATE SPEED CONTROL (CALLED FROM OUTSIDE)
                        ; ---------------------------------------------------
                        ;
0FD4  8D621F    UPDSPD: STA     CSPEED
0FD7  C953              CMP     #'S'
0FD9  D002 ^0FDD        BNE     UPSNTS          ;NOT SINGLE STEP
0FDB  A908              LDA     #8              ;GO AT FULL TILT WHEN IN SINGLE STEP
0FDD  290F      UPSNTS: AND     #$0F
0FDF  A8                TAY                    ;FORM HOOK INTO SPEED TABLE.
0FE0  B91F1F            LDA     SPEEDS-1,Y
0FE3  8D601F            STA     CURCNT
0FE6  A901              LDA     #1
0FE8  8D611F            STA     HCOUNT          ;SET COUNTER SO THAT NEXT TIME THRU MAIN LOOP
0FEB  60                RTS                    ;SPEED WILL BE CHANGED TO NEW SPEED.
                        ;
0FEC  AD                DB      $AD ;==FLAK
                        ;
                        ; BLITZ, RABBIT, TURTLE & SNAIL: SPEED SETTINGS
                        ; ---------------------------------------------
                        ;
                        ;
0FED  A938      BLITZ:  LDA     #'8'            ;HIGH SPEED, BRO..
0FEF  20D40F            JSR     UPDSPD
0FF2  60                RTS
0FF3  A935      RABBIT: LDA     #'5'
0FF5  20D40F            JSR     UPDSPD
0FF8  60                RTS
                        ;
0FF9  A932      TURTLE: LDA     #'2'
0FFB  20D40F            JSR     UPDSPD
0FFE  60                RTS
                        ;
0FFF  A953      SNAIL:  LDA     #'S'
1001  20D40F            JSR     UPDSPD
1004  60                RTS
                        ;
                        ;
                        ;    CLEAR ENTIRE SCREEN TO ORIGINAL BACKGROUND COLOR
                        ;    -----------------------------------------------
                        ;
1005  AD7C1F    CLROLD: LDA     BKCOLR          ;GET BACKGROUND COLOR
1008  201F10            JSR     DOBKND
100B  60                RTS
                        ;
100C  AD                DB      $AD ;==FLAK
                        ;
                        ;
                        ; CHBKND - CHANGE HI-RES BACKGROUND (CALLED EXTERNALLY)
                        ; -------------------------------------------------
                        ;
100D  AD801F    CHBKND: LDA     HITTYP
1010  F003 ^1015        BEQ     CHBOK
1012  4CD064            JMP     SOUND
1015  AD3E1F    CHBOK:  LDA     XCHAR1
```

```
1018  8D7D1F            STA     DSBKND
101B  201F10            JSR     DOBKND          ;GO CHANGE IT
101E  60                RTS
                ;
                ;
                ; DOBKND - CHANGE HI-RES BACKGROUND
                ; -------------------------------
                ;
101F  290F      DOBKND: AND     #$0F
1021  8D7C1F            STA     BKCOLR          ;UPDATE BACKGROUND COLOR
1024  206E1C            JSR     LSTERA
1027  AD541F            LDA     CUMODE          ;DO IT REGARDLESS OF WHAT MODE WE'RE IN.
102A  8D551F            STA     HLDMDE          ;WE WANT TO 'FLASH' THE NEW BACKGROUND COLOR.
102D  209511            JSR     MASTER          ;SWITCH TO PICTURE
1030  AD7C1F            LDA     BKCOLR
1033  20990F            JSR     COLCH2          ;CHANGE TO NEW BACKGROUND COLOR.
1036  207E1D            JSR     HBKGND          ;DO IT !
1039  AD551F            LDA     HLDMDE          ;RESTORE PREVIOUS MODE
103C  F004 ^1042        BEQ     CHBMAS          ;'TWAS MASTER
103E  206611            JSR     MONITR
1041  60                RTS
1042  209511    CHBMAS: JSR     MASTER          ;RESTORE PAINT MODE AND PAINTING COLOR
1045  60                RTS
                ;
                ;
                ;    FLIP BETWEEN DRAW/ENTER MODES
                ;    -----------------------------
                ;
1046  AD691F    SWMODE: LDA     MEFLAG          ;WHERE ARE WE NOW?
1049  101C ^1067        BPL     DRAWNW          ;WE'RE ENTERING
104B  A900              LDA     #$0             ;CLEAR OUT DISPLACEMENT PTR TO TARGET
104D  8D571F            STA     TPTR
1050  8D911F            STA TBSPTR
1053  AE651F            LDX     TAMFLG          ;WHAT'S THE SIZING MODE?
1056  3003 ^105B        BMI     SWMNLK          ;NOT PADDLES
1058  AD2A1F            LDA     MAXPTS          ;FORCE # OF PTS TO BE = MAXIMUM
105B  A0FF      SWMNLK: LDY     #$FF            ;UPDATE SIZE OF PATTERN
105D  9168              STA     [TBASEX],Y
105F  8D2B1F            STA     NUMPTS          ;WE'RE ENTRERING A NEW PATTERN
1062  A90D              LDA     #$0D            ;AN INVERTED 'M' FOR MAKE
1064  4C6910            JMP     UPMODE
1067  A9CD      DRAWNW: LDA     #$CD            ;AN 'M' FOR MAKE OFF
1069  8D691F    UPMODE: STA     MEFLAG
106C  A09E              LDY     #TXMODE
106E  20BA17            JSR     DPAGE2          ;UPDATE CONTROL DISPLAY
1071  20AD1B            JSR     TSZDSP
1074  60                RTS
                ;
1075  AD                DB      $AD ;==FLAK
                ;
                ;
                ;
                ;
                ;    DRAWON - FLIP DRAW ENABLED SWITHC
                ;    ---------------------------------
```

```
                        ;
1076  AD681F    DRAWON: LDA     DRWFLG
1079  1005 ^1080        BPL     DTRNOF          ;WE'RE DRAWING, LET'S CUT IT OUT.
107B  A915      DTRNON: LDA     #$15
107D  4C8210            JMP     DUPMDE
1080  A9D5      DTRNOF: LDA     #$D5            ;A NORMAL 'U' FOR UP
1082  8D681F    DUPMDE: STA     DRWFLG
1085  A027              LDY     #TXDRWF
1087  20BA17            JSR     DPAGE2          ;UPDATE CONTROL DISPLY
108A  60                RTS
                        ;
108B  AD                DB      $AD ;==FLAK
                        ;
                        ;
                        ;    FREEZE - FLIP FREEZE FLAG
                        ;    ------------------------
                        ;
108C  AD671F    FREEZE: LDA     FRZFLG
108F  1005 ^1096        BPL     LKMODE
1091  A920      FRZON:  LDA     #$20            ;A BLACK ON WHITE SPACE
1093  4C9F10            JMP     FUPMDE
1096  AD541F    LKMODE: LDA     CUMODE          ;DON'T UNFREEZE IF IN TEXT MODE
1099  F002 ^109D        BEQ     FTRNOF
109B  100A ^10A7        BPL     NOUNF
109D  A9A0      FTRNOF: LDA     #$A0            ;NORMAL SPACE
109F  8D671F    FUPMDE: STA     FRZFLG
10A2  A09E              LDY     #TXFREZ
10A4  20AC17            JSR     DPAGE1          ;UPDATE CONTROL DISPLAY
10A7  60        NOUNF:  RTS
                        ;
10A8  AD                DB      $AD ;==FLAK
                        ;
                        ;
                        ; PNTHIT - TOGGLE BETWEEN PAINT (MASTER) AND MONITOR MODES. SAME AS BRSHIT.
                        ; ------------------------------------------------------------------------
                        ;
10A9  206E1C    PNTHIT: JSR     LSTERA
10AC  AD6E1F            LDA     PNTFLG          ;WHERE ARE WE NOW?
10AF  100E ^10BF        BPL     PNPNOF          ;WE'RE PAINTING, GET RID OF PICTURE.
10B1  209511    PNPNON: JSR     MASTER          ;SWITCH TO PICTURE
10B4  A910              LDA     #$10            ;INVERSE 'P' FOR PAINT
10B6  8D6E1F            STA     PNTFLG
10B9  A0A7              LDY     #TXPNT
10BB  20AC17            JSR     DPAGE1
10BE  60                RTS
                        ;
10BF  206611    PNPNOF: JSR     MONITR          ;SWITCH TO MONITOR
10C2  A9D0              LDA     #$D0            ;REGULAR 'P' FOR PAINT OFF.
10C4  8D6E1F            STA     PNTFLG
10C7  A0A7              LDY     #TXPNT
10C9  20AC17            JSR     DPAGE1
10CC  60                RTS
                        ;
                        ; VERHIT - TOGGLE VISUALIZE MODE
                        ; ------------------------------------------------
```

```
                        ;
10CD  AD6D1F      VERHIT: LDA     VISFLG
10D0  1005 ^10D7          BPL     VEROFF
10D2  A916        VERHPT: LDA     #$16            ;INVERSE 'V' FOR VISUALIZE ON
10D4  4CD910              JMP     VERUPD
10D7  A9D6        VEROFF: LDA     #$D6
10D9  8D6D1F      VERUPD: STA     VISFLG
10DC  A08A                LDY     #TXVER
10DE  20AC17              JSR     DPAGE1
10E1  206E1C              JSR     LSTERA          ;ERASE WHATEVER IT WAS WE LAST DISPLAYED.
10E4  60                  RTS
                        ;
                        ; WRPHIT - TOGGLE WRAPAAROUND MODE
                        ; ---------------------------------------------------
                        ;
10E5  AD711F      WRPHIT: LDA     WRPFLG
10E8  1008 ^10F2          BPL     WRPOFF
10EA  20F61D      WRPON:  JSR     HGHCLR          ;CLEAR HIGH ORDER BITS OF SCREEN LOC SO THAT
                                                  ;OBJECT IS FORCED TO BE WITHIN SCREEN LIMITS.
10ED  A917                LDA     #$17            ;INVERSE 'W' FOR WRAPAROUND
10EF  4CF410              JMP     WRPUPD
10F2  A9D7        WRPOFF: LDA     #$D7
10F4  8D711F      WRPUPD: STA     WRPFLG
10F7  A08A                LDY     #TXWRP
10F9  20BA17              JSR     DPAGE2
10FC  AC541F              LDY     CUMODE          ;IF WE'RE PAINTING, THEN WE SHOULD INSTIUTE
10FF  300C ^110D          BMI     WRPEXT          ;THE CHANGE. IF IN MONITOR WE'LL FORCE
1101  AD711F              LDA     WRPFLG
1104  8D981F              STA     WRPIND          ;WRAPAROUND TO BE ON.
1107  206E1C              JSR     LSTERA
110A  20B91C              JSR     WRAPAT          ;DO THE PATCH TO DRAWIT
110D  60          WRPEXT: RTS
                        ;
                        ; QSTHIT - TOGGLE QUICK STROKE MODE
                        ; ---------------------------------------------------
                        ;
110E  AD701F      QSTHIT: LDA     QSTFLG
1111  1016 ^1129          BPL     QSTOFF
1113  A900                LDA     #0              ;RESET POINTERS TO BEGINNING OF QUICKSTROKE
1115  8D871F              STA     QPTR
1118  8D581F              STA     SPTR            ;BUFFER
111B  8D921F              STA     BSPTR
111E  208A1B              JSR     SSZDSP
1121  206E1C              JSR     LSTERA
1124  A911                LDA     #$11            ;INVERSE 'Q' FOR QUICK STROKE
1126  4C2B11              JMP     QSTUPD
1129  A9D1        QSTOFF: LDA     #$D1
112B  8D701F      QSTUPD: STA     QSTFLG
112E  A00A                LDY     #TXQST
1130  20BA17              JSR     DPAGE2
1133  60                  RTS
                        ;
                        ; LOCHIT - TOGGLE LOCATE MODE
                        ; ---------------------------------------------------
                        ;
```

```
1134  AD6B1F      LOCHIT: LDA     LOCFLG
1137  1011 ^114A          BPL     LOCOFF
1139  ADA41F      LOCON:  LDA     LOCX            ;RESTORE PREVIOUS LOCATE VECTOR
113C  8D441F              STA     USEX
113F  ADA51F              LDA     LOCY
1142  8D451F              STA     USEY
1145  A90C                LDA     #$0C            ;INVERSE 'L' FOR LOCATE
1147  4C5D11              JMP     LOCUPD
114A  AD6B1F      LOCOFF: LDA     LOCFLG          ;CHECK IF LOCATE ALREADY OFF
114D  300C ^115B          BMI     LOCAOF
114F  AD441F              LDA     USEX            ;IF ON, THEN SAVE CURRENT LOCATE VECTOR.
1152  8DA41F              STA     LOCX
1155  AD451F              LDA     USEY
1158  8DA51F              STA     LOCY
115B  A9CC        LOCAOF: LDA     #$CC
115D  8D6B1F      LOCUPD: STA     LOCFLG
1160  A094                LDY     #TXLOC
1162  20AC17              JSR     DPAGE1
1165  60                  RTS


                  ;    MONITR - DISPLAY MONITOR SCREEN
                  ;    ------------------------------
1166  206E1C      MONITR: JSR     LSTERA
1169  AD541F              LDA CUMODE  ;DON'T COPY IF WE'RE ALREADY IN MONITOR.
116C  3003 ^1171          BMI     NOCOP0
116E  203864              JSR     COPYTO          ;COPY HGR PAGE 1 TO HGR PAGE 2
1171  A906        NOCOP0: LDA     #6              ;SWITCH TO BLACK BACKGROUND FOR MONITOR.
1173  20990F              JSR     COLCH2
1176  207E1D              JSR     HBKGND
1179  A9FF                LDA     #$FF            ;ESTABLISH MONITOR MODE
117B  8D541F              STA     CUMODE
117E  A903                LDA     #3              ;DRAW IN WHITE WHEN IN MONITOR MODE.
1180  20990F              JSR     COLCH2
1183  A901                LDA     #1              ;ALWAYS USE NORMAL PAINT MODE
1185  8D941F              STA     PNMIND          ;WHEN IN MONITOR.
1188  202416              JSR     PNMSET
118B  A917                LDA     #$17            ;ALWAYS KEEP WRAPAROUND ON WHEN IN
118D  8D981F              STA     WRPIND          ;MONITOR MODE
1190  20B91C              JSR     WRAPAT
1193  60                  RTS
                  ;
1194  AD                  DB      $AD ;==FLAK
                  ;
                  ;
                  ;   MASTER - DISPLAY PICTURE
                  ;   ------------------------
                  ;
1195  206E1C      MASTER: JSR     LSTERA
1198  AD541F              LDA     CUMODE          ;IF WE'RE NOT IN MONITOR MODE, THEN DON'T
                  ;                                  ;BOTHER COPYING HGR2 TO HGR1. DON'T DO EITHER
119B  F003 ^11A0          BEQ     NOTMN6          ;IF IN MASTER, CAUSE WE'LL BE COPYING OLD IMAG
119D  201464              JSR     COPYBK
11A0  A900        NOTMN6: LDA     #$0             ;RESTORE MODE TO DISPLAY PICTURE.
11A2  8D541F              STA     CUMODE
```

```
11A5  AD931F          LDA   PNMFLG      ;RESTORE PAINT MODE TO WHATEVER IT WAS
11A8  200A16          JSR   PNMHIT
11AB  AD711F          LDA   WRPFLG      ;RESTORE WRAPAROUND CTL TO WHATEVER IT WAS
11AE  8D981F          STA   WRPIND
11B1  20B91C          JSR   WRAPAT
11B4  AD7A1F          LDA   BCOLOR      ;RESTORE PAINT COLOR
11B7  20990F          JSR   COLCH2
11BA  60              RTS
                ;
11BB  AD              DB    $AD ;==FLAK
                ;
                ; KB VECTOR HANDLERS
                ; ------------------
                ;
11BC  203212    KBLEFT: JSR   KBSTUP      ;SET UP X & Y REGS FOR ADD OR SET,
11BF  CA                DEX               ;DEPENDING IF ASCII CONTROL BIT IS SET.
11C0  4CDB11            JMP   KBVECH      ;GO LEFT
                ;
11C3  203212    KBRGHT: JSR   KBSTUP
11C6  E8                INX               ;GO RIGHT
11C7  4CDB11            JMP   KBVECH
                ;
11CA  203212    KBUP:   JSR   KBSTUP
11CD  C8                INY               ;GO UP
11CE  4CDB11            JMP   KBVECH
                ;
11D1  203212    KBDWN:  JSR   KBSTUP
11D4  88                DEY               ;GO DOWN
11D5  4CDB11            JMP   KBVECH
                ;
11D8  203212    KBSTIL: JSR   KBSTUP      ;STAY RIGHT THERE (0,0)
                ;
                ;
11DB  8E281F    KBVECH: STX   SAVEX
11DE  8C291F            STY   SAVEY
11E1  A200              LDX   #0          ;TURN ON FLAGS WHICH WILL TELL US WHETHER WE
11E3  A000              LDY   #0          ;SHOULD USE THE (X,Y) VECTOR WE FIGURE OUT.
11E5  AD6B1F            LDA   LOCFLG      ;IN LOCATE MODE?
11E8  3008 ^11F2        BMI   KBVE33      ;NO
11EA  A9FF              LDA   #-1         ;SET CURRENT SOURCE OF VECTORS FOR LOCATE MODE
11EC  8D6C1F            STA   CURLOC      ;TO KB.
11EF  4C0912            JMP   KBOK        ;SINCE WE'RE IN LOCATE MODE, THERE'S NO NEED TO
                ;                         ;CHECK IF HOLDX OR HOLDY ARE ON.
11F2  AD741F    KBVE33: LDA   XCRUISE     ;IS HOLDX ON?
11F5  3001 ^11F8        BMI   KBNOCX      ;NO, WE CAN'T USE X PORTION OF OUR VECTOR.
11F7  E8                INX               ;SET 'OK TO UPDATE X' FLAG ON.
11F8  AD751F    KBNOCX: LDA   YCRUISE     ;SAME THING FOR Y
11FB  3001 ^11FE        BMI   KBNOCY
11FD  C8                INY
11FE  88        KBNOCY: DEY               ;NOW TO CHECK IF WE'RE ALLOWED TO
11FF  F007 ^1208        BEQ   KBOK1       ;UPDATE EITHER X OR Y.
1201  CA                DEX               ;SO FAR, WE CAN'T DO Y.
1202  F005 ^1209        BEQ   KBOK        ;OK TO DO X.
1204  20D064            JSR   SOUND       ;BUZZ 'EM. NO GO.
1207  60                RTS
```

```
1208 CA          KBOK1:  DEX                     ;EVEN OUT X CHECKING
1209 E8          KBOK:   INX
120A F006 ^1212          BEQ     KBNOX          ;DON'T UPDATE X
120C AE281F              LDX     SAVEX
120F 8E441F              STX     USEX
1212 C8          KBNOX:  INY
1213 F006 ^121B          BEQ     KBNOY          ;DON'T UPDATE Y
1215 AC291F              LDY     SAVEY
1218 8C451F              STY     USEY
121B AD6B1F      KBNOY:  LDA     LOCFLG         ;ARE WE IN LOCATE?
121E 1006 ^1226          BPL     KBLOCO         ;YES, DON'T UPDATE (X,Y) TO BE APPLIED TO
1220 8E461F              STX     BUSEX          ;TARGET ONCE WE GET OUT OF LOCATE.
1223 8C471F              STY     BUSEY          ;UPDATE THE 'REAL' VECTOR TO BE APPLIED.
1226 AD841F      KBLOCO: LDA     KBFRCH         ;SHOULD WE TURN FREEZE OFF?
1229 F006 ^1231          BEQ     KBLEXT         ;NOPE
122B 8D611F              STA     HCOUNT         ;MAKE THINGS GO FASTER
122E 209D10              JSR     FTRNOF         ;TURN FREEZE OFF - KBFRCH FLAG WILL CAUSE IT TO
1231 60          KBLEXT: RTS                    ;BE TURNED OFF AFTER ONE PASS THROUGH LOOP.
                 ;
                 ;
                 ; KBSTUP - SET X & Y REGISTERS UP TO HANDLE KB VECTOR.
                 ; ---------------------------------------------------
                 ;
1232 48          KBSTUP: PHA
1233 A200                LDX     #0
1235 8E841F              STX     KBFRCH         ;CLEAR FREEZE TOGGLE INDICATOR.
1238 2940                AND     #64            ;IS CONTROL BIT ON?
123A D008 ^1244          BNE     KBNTAD         ;YES, CONTROL KEY WAS NOT DEPRESSED.
123C AE441F              LDX     USEX           ;ADD OUR VECTOR THE LAST USED VECTOR.
123F AC451F              LDY     USEY
1242 68                  PLA
1243 60                  RTS
1244 AD6B1F      KBNTAD: LDA     LOCFLG         ;DON'T SET HOLDX OR Y IF IN LOCATE.
1247 1006 ^124F          BPL     KBNHLD
1249 206E12              JSR     FIXX
124C 208412              JSR     FIXY
124F A200        KBNHLD: LDX     #0
1251 A000                LDY     #0
1253 68                  PLA
1254 C948                CMP     #'H'           ;DID THEY HIT 'H'?
1256 F00A ^1262          BEQ     KBSTEX         ;IF SO, THEN WE DON'T WANT TO TURN FREEZE ON
1258 AD671F              LDA     FRZFLG         ;TEMPORARILY. IF FREEZE ISN'T ON NOW, THEN WE
125B 3005 ^1262          BMI     KBSTEX         ;DON'T WANT TO DO SO EITHER.
125D A901                LDA     #1             ;FREEZE WAS ON, SO SET FLAG WHICH WILL CAUSE
125F 8D841F              STA     KBFRCH         ;LOOP TO BE EXECUTED ONCE, EACH TIME THEY
1262 60          KBSTEX: RTS                    ;G,Y,N OR J. A SNAIL MODE EMULATION.
                 ;
                 ;
                 ; PDREST - RESTORE LOCATE MODE CONTROL TO PADDLES (FROM KB)
                 ; ---------------------------------------------------------
                 ;
1263 A900        PDREST: LDA     #0
1265 8D6C1F              STA     CURLOC
1268 60                  RTS                    ;THINGS HAVE BEEN HARDER
                 ;
```

```
                        ;
                        ;    HOLDX - FREEZE CURRENT DELTA X INPUT
                        ;    ------------------------------------
                        ;
1269  AD741F    HOLDX:  LDA     XCRUISE
126C  1005 ^1273      BPL     XTRNOF
126E  A91A      FIXX:   LDA     #$1A            ;TURN HOLD X ON - REVERSE 'Z'
1270  4C7512            JMP     XUPMDE
1273  A9DA      XTRNOF: LDA     #$DA            ;TURN HOLD X OZF - NORMAL 'F'
1275  8D741F    XUPMDE: STA     XCRUISE
1278  A014              LDY     #TXHLDX
127A  20BA17            JSR     DPAGE2
127D  60                RTS
                        ;
127E  AD                DB      $AD ;==FLAK
                        ;
                        ;
                        ;    HOLDY - FREEZE CURRENT DELTA Y INPUT
                        ;    ------------------------------------
                        ;
127F  AD751F    HOLDY:  LDA      YCRUISE
1282  1005 ^1289      BPL     YTRNOF
1284  A918      FIXY:   LDA     #$18            ;TURN HOLD Y ON - REVERSE 'X'
1286  4C8B12            JMP     YUPMDE
1289  A9D8      YTRNOF: LDA     #$D8            ;TURN HOLD Y OFF - NORMAL 'X'
128B  8D751F    YUPMDE: STA     YCRUISE
128E  A016              LDY     #TXHLDY
1290  20BA17            JSR     DPAGE2
1293  60                RTS
                        ;
1294  AD                DB      $AD ;==FLAK
                        ;
                        ;
                        ;    NEGX & NEGY - FLIP FLAGS FOR REVERSAL OF SOURCE VECTOR
                        ;    -----------------------------------------------------
                        ;
1295  AD6B1F    NEGX:   LDA     LOCFLG          ;IN LOCATE MODE?
1298  300F ^12A9        BMI     NEGXNL          ;NOPE
129A  A9FF              LDA     #-1             ;SWITCH LOCATE CONTROL TO KB
129C  8D6C1F            STA     CURLOC
129F  A900              LDA     #0              ;NOW REVERSE MOTION
12A1  38                SEC
12A2  ED441F            SBC     USEX
12A5  8D441F            STA     USEX
12A8  60                RTS
                        ;
12A9  AD741F    NEGXNL: LDA     XCRUISE         ;IF WE'RE CRUISING, DON'T TOGGLE MODE
12AC  100A ^12B8        BPL     NGXKB           ;YUP
12AE  AD5B1F            LDA     CURSRC          ;NO CRUISE, SOURCE BETTER BE KB OR PATTERN.
12B1  3005 ^12B8        BMI     NGXKB           ;KB
12B3  D00D ^12C2        BNE     NGXOK           ;PATTERN
12B5  4CD712            JMP     NGXPAD          ;DON'T DO THAT!!
12B8  A900      NGXKB:  LDA     #0
12BA  38                SEC
12BB  ED461F            SBC     BUSEX           ;NEGATE KB VECTOR
```

```
12BE  8D461F            STA     BUSEX
12C1  60                RTS
12C2  AD721F      NGXOK: LDA     XNEG
12C5  3005 ^12CC        BMI     NXFIX
12C7  A9AC        XNEGOF: LDA    #$AC            ;NORMAL ','
12C9  4CCE12            JMP     NXFIX+2
12CC  A92C        NXFIX: LDA     #$2C            ;INVERSE ','
12CE  8D721F            STA     XNEG
12D1  A094              LDY     #TXNEGX
12D3  20BA17            JSR     DPAGE2
12D6  60                RTS
12D7  20D064      NGXPAD: JSR    SOUND
12DA  60                RTS
                  ;
12DB  AD6B1F      NEGY:  LDA     LOCFLG          ;IN LOCATE MODE?
12DE  300F ^12EF        BMI     NEGYNL          ;NOPE
12E0  A9FF              LDA     #-1             ;SWITCH LOCATE CONTROL TO KB
12E2  8D6C1F            STA     CURLOC
12E5  A900              LDA     #0              ;NOW REVERSE MOTION
12E7  38                SEC
12E8  ED451F            SBC     USEY
12EB  8D451F            STA     USEY
12EE  60                RTS
                  ;
12EF  AD751F      NEGYNL: LDA    YCRUISE         ;IF WE'RE CRUISING, DON'T TOGGLE MODE
12F2  100A ^12FE        BPL     NGYKB           ;YUP
12F4  AD5B1F            LDA     CURSRC          ;NO CRUISE, SOURCE BETTER BE KB OR PATTERN.
12F7  3005 ^12FE        BMI     NGYKB           ;KB
12F9  D00D ^1308        BNE     NGYOK           ;PATTERN
12FB  4C1D13            JMP     NGYPAD          ;DON'T DO THAT!!
12FE  A900        NGYKB: LDA     #0
1300  38                SEC
1301  ED471F            SBC     BUSEY           ;NEGATE KB VECTOR
1304  8D471F            STA     BUSEY
1307  60                RTS
1308  AD731F      NGYOK: LDA     YNEG
130B  3005 ^1312        BMI     NYFIY
130D  A9AE        YNEGOF: LDA    #$AE            ;NORMAL '.'
130F  4C1413            JMP     NYFIY+2
1312  A92E        NYFIY: LDA     #$2E            ;INVERSE '.'
1314  8D731F            STA     YNEG
1317  A096              LDY     #TXNEGY
1319  20BA17            JSR     DPAGE2
131C  60                RTS
131D  20D064      NGYPAD: JSR    SOUND
1320  60                RTS
                  ;
                  ; TRGMDE - SET BRUSH/TARGET SIZING MODE
                  ; ---------------------------------------
                  ;
1321  AD801F      TRGMDE: LDA    HITTYP
1324  F003 ^1329        BEQ     TRGMOK
1326  4CD064            JMP     SOUND
1329  AD3E1F      TRGMOK: LDA    XCHAR1
132C  8D661F            STA     DSTFLG
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132F 206E1C            JSR    LSTERA
1332 AD661F            LDA    DSTFLG
1335 C94E              CMP    #'N'          ;CHANGING TO NORMAL MODE?
1337 D01E ^1357        BNE    TRGMNN        ;NOPE
1339 A9FF              LDA    #255          ;IN NORMAL MODE, MAX # PTS IS 255
133B 8D2A1F            STA    MAXPTS
133E 8D651F            STA    TAMFLG        ;-1 MEANS NORMAL
1341 AD691F            LDA    MEFLAG        ;NOW: WHAT DO WE DO IF WE'RE ENTERING?
1344 1007 ^134D        BPL    TRGME
1346 A0FF              LDY    #$FF          ;NOT ENTERING; # PTS TO DISPLAY
1348 B168              LDA    [TBASEX],Y    ;IS THE INHERENT SIZE OF THE OBJECT.
134A 4C5013            JMP    TRGME+3
134D AD571F      TRGME: LDA    TPTR          ;ENTERING; # PTS TO DISPLAY IS THE NUMBER
1350 8D2B1F            STA    NUMPTS        ;THAT HAVE BEEN ENTERED.
1353 20AD1B            JSR    TSZDSP        ;TELL THE WORLD ABOUT IT.
1356 60                RTS
                 ;
                 ;
1357 2907        TRGMNN: AND   #$07          ;WE'LL GET THE SIZE FROM THE PADDLES, AND THAT
1359 8D651F            STA    TAMFLG        ;HAPPENS ELSEWHERE. SO JUST FIX UP THE FLAG AND
135C 60                RTS                  ;SCRAMBLE YOUR EGGS.
                 ;
                 ;
                 ; SRCMDE - UPDATE STROKE (SOURCE) SIZING MODE.
                 ; ---------------------------------------------
                 ;
135D AD801F      SRCMDE: LDA   HITTYP
1360 F003 ^1365        BEQ    SRCMOK
1362 4CD064            JMP    SOUND
1365 AD3E1F      SRCMOK: LDA   XCHAR1
1368 8D641F            STA    DSSFLG
136B C94E              CMP    #'N'          ;NORMAL MODE?
136D D01B ^138A        BNE    SRCMNN        ;NOPE
136F A9FF              LDA    #255          ;NORMAL MODE
1371 8D631F            STA    SAMFLG
1374 AD5B1F            LDA    CURSRC        ;IS CURRENT STROKE A PATTERN?
1377 F00B ^1384        BEQ    SRCONP
1379 A0FF              LDY    #$FF          ;YES, GET THE PATTERN'S INHERENT SIZE.
137B B16C              LDA    [SBASEX],Y
137D 8D2E1F            STA    SNMPTS
1380 208A1B            JSR    SSZDSP
1383 60                RTS
                 ;
1384 A920        SRCONP: LDA   #32          ;DISPLAY OF WHICH IS DETERMINED BY THE SIZING
1386 8D2E1F            STA    SNMPTS        ;MODE. IN NORMAL MODE, MAX # PTS TO ENTER/
1389 60                RTS                  ;DISPLAY IS 32.
                 ;
138A 2907        SRCMNN: AND   #$07          ;USE ONE OF THE PADDLES TO DETERMINE THE SIZE
138C 8D631F            STA    SAMFLG        ;OF THE STROKE. SINCE THE PADDLES ARE READ
138F 60                RTS                  ;ELSEWHERE, DON'T WORRY ABOUT SETTING THE
                 ;                          ;SIZE HERE.
                 ;
                 ;
                 ; SRCALL - SET SOURCE OR STROKE (CALLED FROM OUTSIDE)
                 ; ---------------------------------------------
```

```
                        ;
1390  AD801F      SRCALL: LDA     HITTYP
1393  F003 ^1398          BEQ     SRCAOK
1395  4CD064              JMP     SOUND
1398  AD3E1F      SRCAOK: LDA     XCHAR1
139B  8D5C1F              STA     CSOURC
139E  C950                CMP     #'P'            ;IS SOURCE PADDLES?
13A0  F023 ^13C5          BEQ     SRCAP           ;YUP
13A2  290F                AND     #$0F
13A4  8D5B1F              STA     CURSRC          ;SAVE PATTERN # WE'RE USING AS STROKE.
13A7  20E213              JSR     SRSETB          ;SET UP HOOK INTO OUR PATTERN'S VECTORS.
13AA  206E1C              JSR     LSTERA          ;IN CASE WE'RE IN VISUALIZE MODE
13AD  A0FF                LDY     #$FF            ;GET INHERENT SIZE OF PATTERN
13AF  B16C                LDA     [SBASEX],Y
13B1  8D881F              STA     ONMPTS
13B4  A900                LDA     #0
13B6  8D871F              STA     OPTR
13B9  AE631F              LDX     SAMFLG          ;CHECK SIZING MODE TO MAKE SURE WE SET UP
13BC  1006 ^13C4          BPL     SRCAN0          ;PROPERLY. BRANCH IF NOT IN NORMAL MODE.
13BE  8D2E1F              STA     SNMPTS
13C1  208A1B              JSR     SSZDSP
13C4  60          SRCAN0: RTS                     ;IF SIZING MODE WAS EITHER LOCK OR PADDLES,
                        ;                         ;THEN # PTS IS ALREADY SET OR WILL BE SET.
13C5  A900        SRCAP:  LDA     #0               ;0 IS FOR PADDLES
13C7  8D5B1F              STA     CURSRC          ;STORE INTERNAL SOURCE DESIGNATION
13CA  20C712              JSR     XNEGOF
13CD  200D13              JSR     YNEGOF          ;SETTING OF NEGX & NEGY IS ONLY SIGNIFICANT
                                                  ;WHEN SOURCE IS A PATTERN.
13D0  A0FF                LDY     #$FF
13D2  AD631F              LDA     SAMFLG          ;IF WE'RE IN LOCK MODE, WE ARE DEALING WITH
13D5  100A ^13E1          BPL     SRCALK          ;A FIXED # OF PTS, DETERMINED BY A PADDLE.
13D7  A920                LDA     #32             ;NOT LOCKED, SET CURRENT LENGTH = 32.
13D9  9174                STA     [BBASEX],Y      ;IF PDLS ARE CONTROLLING SIZE, THIS WILL BE
13DB  8D2E1F              STA     SNMPTS          ;CHANGED UPON REENTRY INTO MAIN LOOP.
13DE  208A1B              JSR     SSZDSP
13E1  60          SRCALK: RTS
                        ;
                        ; SRSETB - FOR CURRENT SOURCE, SET UP PATTERN BASE ADDR IN SBASEX.
                        ; ---------------------------------------------------------------
                        ;
13E2  48          SRSETB: PHA
13E3  18                  CLC
13E4  2A                  ROL     A               ;DOUBLE IT
13E5  A8                  TAY                     ;FORM DISPLACEMENT TO PATTERN TABLE
13E6  B9A51F              LDA     APATTS-2,Y
13E9  856C                STA     SBASEX
13EB  856E                STA     SBASEY
13ED  B9A61F              LDA     APATTS-1,Y
13F0  856D                STA     SBASEX+1
13F2  18                  CLC
13F3  6901                ADC     #1
13F5  856F                STA     SBASEY+1
13F7  68                  PLA
13F8  60                  RTS
                        ;
```

```
                        ;
13F9  AD                        DB      $AD ;==FLAK
                        ;
                        ;
                        ;    TRGALL: SELECT PATTERNS 1-8 AS TARGET (CALLED FROM OUTSIDE)
                        ;    ----------------------------------------------------------
                        ;
13FA  AD801F            TRGALL: LDA     HITTYP
13FD  F003 ^1402                BEQ     TRGAOK
13FF  4CD064                    JMP     SOUND
1402  AD3E1F            TRGAOK: LDA     XCHAR1
1405  8D5A1F                    STA     CTARG
1408  290F                      AND     #$0F
140A  48                        PHA
140B  206E1C                    JSR     LSTERA
140E  68                        PLA
140F  202A14                    JSR     TRSETB          ;SET UP PONITERS TO PATTERN
1412  A900                      LDA     #0              ;INITIALIZE POINTERS
1414  8D571F                    STA     TPTR            ;NOW THAT WE'RE SELECTING A NEW PATTERN
1417  8D911F                    STA     TBSPTR
141A  AD651F            NOPERA: LDA     TAMFLG
141D  100A ^1429                BPL     TAUPTS          ;SKIP IF NOT IN NORMAL MODE
141F  A0FF                      LDY     #$FF
1421  B168                      LDA     [TBASEX],Y      ;GET # PTS IN TARGET PATTERN
1423  8D2B1F                    STA     NUMPTS
1426  20AD1B                    JSR     TSZDSP
1429  60                TAUPTS: RTS
                        ;
142A  8D591F            TRSETB: STA     CURTRG          ;SAVE PATTERN #
142D  18                        CLC
142E  2A                        ROL     A               ;DOUBLE IT
142F  A8                        TAY                     ;FORM DISPLACEMENT TO PATTERN TABLE
1430  B9A51F                    LDA     APATTS-2,Y
1433  8568                      STA     TBASEX
1435  856A                      STA     TBASEY
1437  B9A61F                    LDA     APATTS-1,Y
143A  8569                      STA     TBASEX+1
143C  18                        CLC
143D  6901                      ADC     #1
143F  856B                      STA     TBASEY+1
1441  60                        RTS
                        ;
1442  AD                        DB      $AD ;==FLAK
                        ;
                        ;    CLRCTR - CLEAR TICK COUNTERS
                        ;    ----------------------------
                        ;
1443  A900            CLRCTR: LDA     #0
1445  8D051F                    STA     TCTR1
1448  8D061F                    STA     TCTR2
144B  8D071F                    STA     TCTR3
144E  60                        RTS
                        ; LNGEXT - PREPARE FOR A LONG STAY AWAY AND POSSIBLE EVENTUAL REENTRY.
                        ; ------------------------------------------------------------------
                        ;
```

```
144F  AD801F      LNGEXT: LDA     HITTYP
1452  F003 ^1457         BEQ     LNGOK
1454  4CD064              JMP     SOUND
1457  206E1C      LNGOK:  JSR     LSTERA
145A  20B110              JSR     PNPNON          ;TURN PAINT ON (GET PICTURE INTO HGR 1)
145D  209110              JSR     FRZON           ;TURN FREEZE ON
1460  208010              JSR     DTRNOF          ;TURN BRUSH OFF
1463  20D710              JSR     VEROFF          ;TURN VISUALIZE OFF
1466  204A11              JSR     LOCOFF          ;TURN LOCATE OFF
1469  A901                LDA     #1              ;ASSUME THAT OUR DEAR CONTROL DISPLAY
146B  8D831F              STA     CTXFLG          ;WILL BE MUTILATED BY THE STAY AWAY.
146E  60                  RTS
                    ;
                    ; CTRLC - ON CTRLC ABORT SO THAT UPON REENTRY WE RE-INITIALIZE.
                    ; ------------------------------------------------------------
                    ;
146F  204F14        CTRLC:  JSR     LNGEXT
1472  20DA0C              JSR     COMAND          ;THIS WILL MAKE US LEAVE WHEN
1475  A901                LDA     #1              ;WE GO INTO MAIN LOOP NEXT TIME.
1477  8D6A1F              STA     INIFLG          ;NOW WE AREN'T INITIALIZED.
147A  60                  RTS
                    ;
                    ; ESORGE & PSORGE - SET/RESET ORIGINS FOR ENTER & MOVE MODES
                    ; ----------------------------------------------------------
                    ;
147B  AD691F        ESORGE: LDA     MEFLAG          ;HAVE TO BE IN ENTER MODE
147E  3015 ^1495           BMI     SETBUZ
1480  AD6D1F              LDA     VISFLG          ;CAN'T BE IN VISUALIZE.
1483  1010 ^1495         BPL     SETBUZ
1485  A900                LDA     #0
1487  8D8E1F              STA     EORGX           ;SET ORIGIN VECTOR TO 0
148A  8D8F1F              STA     EORGY           ;WE'LL ADD TO IT AS WE ENTER OUR VECTORS.
148D  A210                LDX     #$10
148F  A00A                LDY     #$0A            ;NOW MAKE SOME NOISE TO LET THEM KNOW
1491  20E564              JSR     SOUNDZ          ;WE HEARD 'EM.
1494  60                  RTS
                    ;
1495  20D064      SETBUZ: JSR     SOUND
1498  60                  RTS
                    ;
1499  AD5D1F      PSORGE: LDA     CSTRTX          ;REMEMBER CURRENT SCREEN LOCATION SO WE CAN
149C  8D8C1F              STA     PORGX           ;GET BACK THERE LATER.
149F  AD5E1F              LDA     CSTRTY
14A2  8D8D1F              STA     PORGY
14A5  A220                LDX     #$20            ;SOME NOICE FOR US, TOO
14A7  A010                LDY     #$10
14A9  20E564              JSR     SOUNDZ
14AC  60                  RTS
                    ;
                    ; EGORGE & PGORGE - RESORT TO ENTER / MOVE ORIGINS.
                    ; -------------------------------------------------
                    ;
14AD  AD691F        EGORGE: LDA     MEFLAG          ;ONCE AGAIN, HAVE TO BE IN ENTER.
14B0  30E3 ^1495           BMI     SETBUZ
14B2  AD8E1F              LDA     EORGX           ;GET THE VECTOR WE'VE BEEN ACCUMULATING
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14B5  8D8A1F          STA   ORIGX       ;AND GO SOCK IT BACK TO 'EM.
14B8  AD8F1F          LDA   EORGY
14BB  8D8B1F          STA   ORIGY
14BE  A901            LDA   #1
14C0  8D891F          STA   ORGFLG      ;THIS FLAG IS OUR TICKET TO THE HEART OF THE
14C3  60              RTS               ;ENTER PART OF THE MAIN LOOP.
                ;
14C4  206E1C    PGORGE: JSR   LSTERA
14C7  20F61D          JSR   HGHCLR      ;PUT BRUSH BACK ON SCREEN
14CA  AD8C1F          LDA   PORGX
14CD  8D5D1F          STA   CSTRTX
14D0  8D991F          STA   SCSTRX
14D3  AD8D1F          LDA   PORGY
14D6  8D5E1F          STA   CSTRTY
14D9  8D9B1F          STA   SCSTRY
14DC  60              RTS
                ;
                ; QWIKIE - START EXECUTION OF QUICK STROKE
                ; ---------------------------------------
                ;
14DD  AD6D1F    QWIKIE: LDA   VISFLG      ;LET'S REMEMBER WHAT WE WERE DOING
14E0  8D961F          STA   VISHLD
14E3  20D710          JSR   VEROFF        ;VISUALIZE OFF, PLEASE
14E6  AD6B1F          LDA   LOCFLG
14E9  8D951F          STA   LOCHLD
14EC  204A11          JSR   LOCOFF
14EF  AD621F          LDA   CSPEED        ;SAVE CURRENT SPEED CAUSE WE'RE GONNA
14F2  8D901F          STA   SPDHLD        ;BLITZ THIS BABY OUT.
14F5  20ED0F          JSR   BLITZ
14F8  AD681F          LDA   DRWFLG        ;DRAW REGARDLESS OF WHETHER BRUSH IS DOWN/UP.
14FB  8DA61F          STA   DRWHLD
14FE  207B10          JSR   DTRNON
1501  A901            LDA   #1
1503  8D851F          STA   QSTXEQ        ;SET THE 'EXECUTING QUICKSTROKE' FLAG, WHICH
1506  AD921F          LDA   BSPTR         ;BYPASSES EVERYTHING !!
1509  8D581F          STA   SPTR          ;SET STROKE BUFFER POINTER BACK TO BEGINNING
150C  60              RTS                 ;OF STROKE. QUICKSTROKE WILL TERMINATE WHEN
                                          ;SAVVEC ROUTINE DETECTS THAT SPTR = SNMPTS.
                                          ;THEN FLAG WILL BE TURNED OFF, VERIFY TURNED
                                          ;BACK ON, ETC.
                ;
                ; QWIKI2 - EXECUTE QUICKSTROKE AND RETURN TO STARTING POINT.
                ; ---------------------------------------------------------
                ;
150D  20DD14    QWIKI2: JSR   QWIKIE      ;DO THE USUAL
1510  A9FF            LDA   #-1           ;SET EXECUTING QUICKSTROKE TYPE 2
1512  8D851F          STA   QSTXEQ
1515  209914          JSR   PSORGE        ;REMEMBER CURRENT LOCATION ON SCREEN
1518  60              RTS
                ;
                ; ARROWS - LARROW MOVES POINTER TOWARD BEGINNING OF PATTERN, RIGHT ARROW
                ;          TOWARD END OF PATTERN. ARROWS APPLY IN VISUALIZE, ENTER AND
                ;          PAINT MODES.
                ; ---------------------------------------------------------------------
                ;
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1519  AD6D1F      RARROW: LDA     VISFLG          ;IN VISUALIZE?
151C  3021 ^153F          BMI     RARNVI          ;NOPE
151E  AC921F              LDY     BSPTR
1521  F064 ^1587          BEQ     ARBUZZ          ;PTR IS AT BEGINNING OF STROKE - BUZZ EM
1523  88                  DEY
1524  8C921F              STY     BSPTR
1527  C8                  INY
1528  A900                LDA     #0
152A  38                  SEC
152B  F174                SBC     [BBASEX],Y      ;GET VECTOR WE'RE ADDING TO LIST
152D  8D3B1F              STA     TEMPX
1530  A900                LDA     #0
1532  38                  SEC
1533  F176                SBC     [BBASEY],Y
1535  8D3C1F              STA     TEMPY
1538  208A16              JSR     MOVSTT          ;MOVE STARTING LOCATION BY VECTOR
153B  206E1C              JSR     LSTERA
153E  60                  RTS
                    ;
153F  AD691F      RARNVI: LDA     MEFLAG          ;ENTERING?
1542  1021 ^1565          BPL     RAREN           ;YUP
1544  AC911F              LDY     TBSPTR          ;SAME DEAL:
1547  F03E ^1587          BEQ     ARBUZZ
1549  88                  DEY
154A  8C911F              STY     TBSPTR
154D  C8                  INY
154E  A900                LDA     #0
1550  38                  SEC
1551  F168                SBC     [TBASEX],Y      ;GET VECTOR WE'RE RE-ADDING TO LIST.
1553  8D3B1F              STA     TEMPX
1556  A900                LDA     #0
1558  38                  SEC
1559  F16A                SBC     [TBASEY],Y
155B  8D3C1F              STA     TEMPY
155E  208A16              JSR     MOVSTT          ;AND ADJUST PATTERN STARTING PT.
1561  206E1C              JSR     LSTERA
1564  60                  RTS
                    ;
1565  AC571F      RAREN:  LDY     TPTR
1568  C8                  INY
1569  CC2A1F              CPY     MAXPTS
156C  B019 ^1587          BCS     ARBUZZ
156E  8C571F              STY     TPTR
1571  88                  DEY                     ;NOW ADD VECTOR WE'RE SKIPPING INTO THE
1572  AD8E1F              LDA     EORGX           ;TILL OF THE ORIGINATE VECTOR.
1575  38                  SEC
1576  F168                SBC     [TBASEX],Y
1578  8D8E1F              STA     EORGX
157B  AD8F1F              LDA     EORGY
157E  38                  SEC
157F  F16A                SBC     [TBASEY],Y
1581  8D8F1F              STA     EORGY
1584  4CE915              JMP     ARCHEK          ;LET'S SEE ABOUT UPDATING # OF PTS
                    ;
1587  4CD064      ARBUZZ: JMP     SOUND
```

```
                        ;
                        ;
158A  AD6D1F      LARROW: LDA     VISFLG          ;VISUALIZING?
158D  301D ^15AC          BMI     LARNVI          ;NOPE
158F  AC921F              LDY     BSPTR
1592  C8                  INY                     ;WE HAVE TO MAKE SURE THAT POINTER WILL
1593  CC2E1F              CPY     SNMPTS          ;STILL BE IN RANGE AFTER WE HAVE INCREMENTED IT
1596  B0EF ^1587          BCS     ARBUZZ
1598  8C921F              STY     BSPTR
159B  B174                LDA     [BBASEX],Y      ;GET VECTOR WE'RE REMOVING AND ADJUST
159D  8D3B1F              STA     TEMPX
15A0  B176                LDA     [BBASEY],Y
15A2  8D3C1F              STA     TEMPY
15A5  208A16              JSR     MOVSTT          ;STARTING PT BY THAT MUCH.
15A8  206E1C              JSR     LSTERA
15AB  60                  RTS
                        ;
15AC  AD691F      LARNVI: LDA     MEFLAG          ;ENTERNG?
15AF  101D ^15CE          BPL     LAREN           ;YUP
15B1  AC911F              LDY     TBSPTR
15B4  C8                  INY
15B5  CC2B1F              CPY     NUMPTS
15B8  B0CD ^1587          BCS     ARBUZZ
15BA  8C911F              STY     TBSPTR
15BD  B168                LDA     [TBASEX],Y
15BF  8D3B1F              STA     TEMPX
15C2  B16A                LDA     [TBASEY],Y
15C4  8D3C1F              STA     TEMPY
15C7  208A16              JSR     MOVSTT
15CA  206E1C              JSR     LSTERA
15CD  60                  RTS
                        ;
15CE  AC571F      LAREN:  LDY     TPTR
15D1  F0B4 ^1587          BEQ     ARBUZZ          ;BUZZ 'EM
15D3  88                  DEY
15D4  AD8E1F              LDA     EORGX           ;TAKE THIS VECTOR OUT OF THE ORIGINATE
15D7  18                  CLC                     ;VECTOR.
15D8  7168                ADC     [TBASEX],Y
15DA  8D8E1F              STA     EORGX
15DD  AD8F1F              LDA     EORGY
15E0  18                  CLC
15E1  716A                ADC     [TBASEY],Y
15E3  8D8F1F              STA     EORGY
15E6  8C571F              STY     TPTR
15E9  AD651F      ARCHEK: LDA     TAMFLG          ;LET'S SEE ABOUT UPDATING THE # OF PTS.
15EC  3003 ^15F1          BMI     RARNLK
15EE  AC2A1F              LDY     MAXPTS          ;IT'S LOCKED - USE MAX # PTS.
15F1  8C2B1F      RARNLK: STY     NUMPTS
15F4  98                  TYA
15F5  A0FF                LDY     #$FF
15F7  9168                STA     [TBASEX],Y      ;STORE IT IN PATTERN, TOO.
15F9  20AD1B              JSR     TSZDSP
15FC  206E1C              JSR     LSTERA
15FF  60                  RTS
                        ;
```

```
                        ; PNMHIT - HANDLE CHANGES IN PAINTING MODE
                        ; ---------------------------------------
                        ;
1600 B91D               PNTADS: DW      PAINT1          ;NORMAL PAINTING
1602 C31D                       DW      PAINT2          ;NO CHANGE PAINTING
1604 CD1D                       DW      PAINT3          ;BLACK=)COLORS, COLORS=)WHITE
1606 DE1D                       DW      PAINT4          ;WHITE=)COLORS, COLORS=)BLACK
1608 EF1D                       DW      PAINT5          ;COMPLEMENT
                        ;
160A 2907               PNMHIT: AND     #7
160C 8D7E1F                     STA     TEMP
160F 09A0                       ORA     #$A0            ;MAKE IT ASCII
1611 8D931F                     STA     PNMFLG
1614 A0A7                       LDY     #TXPNM
1616 20BA17                     JSR     DPAGE2
1619 AD541F                     LDA     CUMODE          ;IF WE'RE NOT IN PICTURE MODE, THEN DON'T
161C 3018 ^1636                 BMI     PNMEXT          ;INSTITUTE THE CHANGE.
161E AD7E1F              LDA TEMP
1621 8D941F              STA PNMIND
1624 AD941F             PNMSET: LDA     PNMIND
1627 18                         CLC
1628 2A                         ROL A                   ;DOUBLE IT
1629 A8                         TAY
162A B9FE15                     LDA     PNTADS-2,Y      ;GET LOW ORDER BYTE
162D 8DB71D                     STA     PNTJMP          ;SET UP ADDRESS FOR HPLOT TO USE.
1630 B9FF15                     LDA     PNTADS-1,Y
1633 8DB81D                     STA     PNTJMP+1
1636 60                 PNMEXT: RTS
                        ; MOVROW - ROUTINE TO MOVE ONE SCREEN ROW TO ANOTHER
                        ;          CALLED BY APPLESOFT MENU PROGRAMS.
                        ; ------------------------------------------------
                        ;
1637 AD801F             MOVROW: LDA     HITTYP
163A F003 ^163F                 BEQ     MOVOK
163C 4CD064                     JMP     SOUND
163F AD3E1F             MOVOK:  LDA     XCHAR1          ;GET FROM ROW
1642 8525                       STA     CURSRY
1644 A900                       LDA     #0
1646 8524                       STA     CURSRX
1648 2022FC                     JSR     CURSET          ;DO BASE COMPUTATION
164B A528                       LDA     BASL            ;NOW STEAL THE ADDRESS.
164D 8560                       STA     FROM
164F A529                       LDA     BASH
1651 8561                       STA     FROM+1
1653 AD3F1F                     LDA     XCHAR2          ;GET THE TO ROW.
1656 8525                       STA     CURSRY
1658 2022FC                     JSR     CURSET          ;COMPUTE THAT ADDRESS
165B A028                       LDY     #40             ;MOVE 40 CHARACTERS (ONE ROW)
165D B160               MOVLOP: LDA     [FROM],Y
165F 9128                       STA     [BASL],Y
1661 88                         DEY
1662 10F9 ^165D                 BPL     MOVLOP
1664 60                         RTS
                        ;
                        ; SETQWK - EXTERNAL KB HIT CALL TO SET QUICKSTROKE = CURRENT STROKE.
```

```
                        ; ---------------------------------------------------------------
                        ;
1665  AD801F      SETQWK: LDA     HITTYP
1668  F003 ^166D          BEQ     SETQOK
166A  4CD064              JMP     SOUND
166D  206E1C      SETQOK: JSR     LSTERA
1670  A000                LDY     #0
1672  B16C        SETQL1: LDA     [SBASEX],Y
1674  9174                STA     [BBASEX],Y
1676  C8                  INY
1677  D0F9 ^1672          BNE     SETQL1
1679  B16E        SETQL2: LDA     [SBASEY],Y
167B  9176                STA     [BBASEY],Y
167D  C8                  INY
167E  D0F9 ^1679          BNE     SETQL2
1680  8C921F              STY     BSPTR           ;ZILCH QUICKSTROKE BASE POINTER
1683  88                  DEY
1684  B16C                LDA     [SBASEX],Y      ;GET PATTERN LENGTH
1686  8D2E1F              STA     SNMPTS
1689  60                  RTS
                        ;
                        ;     ================================
                        ;          END OF KB HIT ROUTINES
                        ;     ================================
                        ;
                        ; MOVSTT - ROUTINE TO MOVE STARTING POINT BY VECTOR (TEMPX,TEMPY)
                        ; ---------------------------------------------------------------
                        ;
168A  18          MOVSTT: CLC
168B  A000                LDY     #$0             ;ASSUME POSITIVE VECTOR
168D  AD3C1F              LDA     TEMPY
1690  1002 ^1694          BPL     ADVNM1          ;YUP, IT'S POSITIVE
1692  A003                LDY     #$3             ;SET HIGH ORDER BITS FOR A NEG NUMBER.
1694  6D9B1F      ADVNM1: ADC     SCSTRY
1697  8D9B1F              STA     SCSTRY          ;LOW ORDER
169A  297F                AND     #$7F            ;KEEP ( 128 FOR 8 BIT REGISTER.
169C  8D5E1F              STA     CSTRTY
169F  98                  TYA                     ;GET HIGH ORDER STUFF
16A0  6D9C1F              ADC     SCSTRY+1        ;ADD TO PREVIOUS HIGH ORDER
16A3  2903                AND     #3              ;KEEP IT TO 10 BITS (+/- 512)
16A5  8D9C1F              STA     SCSTRY+1
16A8  EE7F1F              INC     CHGFLG          ;WE CHANGED LOCATIONS THEORETICALLY
16AB  18                  CLC
16AC  A000                LDY     #$0
16AE  AD3B1F              LDA     TEMPX           ;NOW SAME FOR X
16B1  1002 ^16B5          BPL     ADVNM2
16B3  A003                LDY     #3
16B5  6D991F      ADVNM2: ADC     SCSTRX
16B8  8D991F              STA     SCSTRX
16BB  8D5D1F              STA     CSTRTX
16BE  98                  TYA
16BF  6D9A1F              ADC     SCSTRX+1
16C2  2903                AND     #3
16C4  8D9A1F              STA     SCSTRX+1
16C7  AD981F              LDA     WRPIND          ;IF WRAPAROUND IS ON, THEN CLEAR HIGH ORDER
```

```
16CA  3003 ^16CF          BMI     ADVNOC          ;BITS SO WE REMAIN ON SCREEN.
16CC  20F61D              JSR     HGHCLR
16CF  20121B      ADVNOC: JSR     BASDSP          ;DISPLAY SCREEN LOCATION.
16D2  60                  RTS
                  ;
                  ;
                  ;
                  ;    DOFLGS - FROM SAVED FLAGS, REWRITE FLAG CHARACTERS IN CONTROL SCREEN
                  ;    ------------------------------------------------------------------
                  ;
16D3  AD821F      DOFLGS: LDA     TXTFLG          ;CHECK WHERE WE'RE ALLOWED TO WRITE.
16D6  3005 ^16DD          BMI     DOFTP2           ;TOP 2 LINES ONLY
16D8  D006 ^16E0          BNE     DOFNNN           ;CAN'T DO ANY !
16DA  200E17              JSR     DOFLG2          ;DO BOTTOM 2 LINES
16DD  20E116      DOFTP2: JSR     DOFLG1          ;DO TOP 2 LINES
16E0  60          DOFNNN: RTS
                  ;
16E1  20FB1A      DOFLG1: JSR     USEDF
16E4  20321B              JSR     BASDF
16E7  20A61B              JSR     TSZDF
16EA  20831B              JSR     SSZDF
16ED  AD6D1F              LDA     VISFLG
16F0  A08A                LDY     #TXVER
16F2  20AC17              JSR     DPAGE1
16F5  AD6B1F              LDA     LOCFLG
16F8  A094                LDY     #TXLOC
16FA  20AC17              JSR     DPAGE1
16FD  AD671F              LDA     FRZFLG
1700  A09E                LDY     #TXFREZ
1702  20AC17              JSR     DPAGE1
1705  AD6E1F              LDA     PNTFLG
1708  A0A7                LDY     #TXPNT
170A  20AC17              JSR     DPAGE1
170D  60                  RTS
                  ;
170E  AD701F      DOFLG2: LDA     QSTFLG
1711  A00A                LDY     #TXQST
1713  20BA17              JSR     DPAGE2
1716  AD741F              LDA     XCRUISE
1719  A014                LDY     #TXHLDX
171B  20BA17              JSR     DPAGE2
171E  AD751F              LDA     YCRUISE
1721  A016                LDY     #TXHLDY
1723  20BA17              JSR     DPAGE2
1726  AD7A1F              LDA     BCOLOR
1729  09B0                ORA     #$B0
172B  A01E                LDY     #TXCOLR
172D  20BA17              JSR     DPAGE2
1730  AD681F              LDA     DRWFLG
1733  A027                LDY     #TXDRWF
1735  20BA17              JSR     DPAGE2
1738  AD711F              LDA     WRPFLG
173B  A08A                LDY     #TXWRP
173D  20BA17              JSR     DPAGE2
1740  AD721F              LDA     XNEG
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1743  A094              LDY     #TXNEGX
1745  20BA17            JSR     DPAGE2
1748  AD731F            LDA     YNEG
174B  A096              LDY     #TXNEGY
174D  20BA17            JSR     DPAGE2
1750  AD691F            LDA     MEFLAG
1753  A09E              LDY     #TXMODE
1755  20BA17            JSR     DPAGE2
1758  AD931F            LDA     PNMFLG
175B  A0A7              LDY     #TXPNM
175D  20BA17            JSR     DPAGE2
1760  60                RTS
                ;
                ;
1761  AD                DB      $AD ;==FLAK
                ;
                ;
                ; RSETUP - GET THINGS ROLLING AGAIN UPON REENTRY.
                ; ----------------------------------------------
                ;
1762  D8        RSETUP: CLD
1763  AD10C0            LDA     $C010           ;CLEAR KB FLAG
1766  20C417            JSR     GPAGE1          ;SET UP PTRS TO CTL DISPLAY
1769  20041A            JSR     WRTEXT          ;RESTORE CTL DISPLAY
176C  207E17            JSR     RSET1           ;SET UP ZERO PAGE POINTERS
176F  20D316            JSR     DOFLGS          ;SET UP FLAGS IN CTL DISPLAY
1772  AD001F            LDA     REMOTE          ;STORE WHAT REMOTE FLAG WAS UPON ENTRY
1775  8D011F            STA     REMTMP          ;IN REMTMP, SO WE CAN PLAY WITH REMTMP.
1778  A901              LDA     #1
177A  8D611F            STA     HCOUNT
177D  60                RTS
                ;
                ;   RSET1 - ROUTINE TO SET UP 0 PAGE POINTER
                ;   RSET 1 IS CALLED WHEN STARTING, REENTERING OR EXECUTING AN EXTERNAL CALL.
                ;   ------------------------------------------------------------------------
                ;
177E  AD3E1F    RSET1:  LDA     XCHAR1          ;SAVE WHAT'S IN XCHAR1
1781  48                PHA
1782  20C417            JSR     GPAGE1          ;MAKE SURE POINTER TO CONTROL DISPLAY IS
                                                  ;INTACT FOR BENEFIT OF EXTERNAL CALLS VIA EXTCA
1785  ACB71F            LDY     APATTS+16       ;SET UP STROKE BUFFER
1788  8474              STY     BBASEX
178A  8476              STY     BBASEY          ;LOW ORDER BYTE
178C  ACB81F            LDY     APATTS+17
178F  8475              STY     BBASEX+1        ;HIGH ORDER BYTE
1791  C8                INY
1792  8477              STY     BBASEY+1
1794  A900              LDA     #0              ;SET HIT TYPE = EXTERNAL
1796  8D801F            STA     HITTYP          ;SO WE CAN PLAY AROUND.
1799  AD5B1F            LDA     CURSRC          ;IF CURRENT STROKE IS A PATTERN
179C  F003 ^17A1        BEQ     *0+5            ;THEN SET UP POINTERS TO PATTERN BUFFER.
179E  20E213            JSR     SRSETB
17A1  AD591F            LDA     CURTRG
17A4  202A14            JSR     TRSETB          ;SET UP POINTERS TO TARGET PATTERN BUFFER.
17A7  68                PLA
```

```
17A8  8D3E1F            STA     XCHAR1          ;RESTORE XCHAR1
17AB  60                RTS
                ;
                ;   DPAGE1 & 2 TAKE CARE OF WRITING INTO THE TEXT AREA.
                ;   ---------------------------------------------------
                ;
                ;   THE CHARACTER TO BE DISPLAYED SHOULD BE IN A, THE OFFSET INTO
                ;   THE TEXT AREA SHOULD BE IN Y.
                ;
17AC  48        DPAGE1: PHA
17AD  AD821F            LDA     TXTFLG          ;SHOULD WE BE WRITING IN TEXT AREA?
17B0  C901              CMP     #1              ;OK TO WRITE IN TOP 2 LINES?
17B2  F004 ^17B8        BEQ     D1WRNO          ;NOPE
17B4  68                PLA
17B5  9164              STA     [CPAGE1],Y
17B7  60                RTS
17B8  68        D1WRNO: PLA
17B9  60                RTS
                ;
17BA  48        DPAGE2: PHA
17BB  AD821F            LDA     TXTFLG
17BE  D0F8 ^17B8        BNE     D1WRNO
17C0  68                PLA
17C1  9166              STA     [CPAGE2],Y
17C3  60                RTS
                ;
                ;
                ;   GPAGE1 REESTABLISH CONTROL PORTION OF SCREEN.
                ;   ---------------------------------------------
                ;
17C4  A906      GPAGE1: LDA     #$06            ;SET PTRS TO PAGE 1 TEXT
17C6  8565              STA     CPAGE1+1
17C8  A907              LDA     #$07
17CA  8567      GMP12:  STA     CPAGE2+1
17CC  A950              LDA     #$50            ;LOW BYTE IS 50 FOR BOTH SETS OF LINES
17CE  8564              STA     CPAGE1
17D0  8566              STA     CPAGE2
17D2  60                RTS
                ;
17D3  AD                DB      $AD ;==FLAK
                ;
                ;
                ; GETPAD - READ PADDLES, AND RETURN 3 SETS OF SCALED VALUES.
                ; ----------------------------------------------------------
                ;
17D4  AA        GETPAD: TAX                     ;GET PADDLE TO READ THIS TIME
17D5  201EFB            JSR     PREAD           ;VALUE COMES BACK IN Y REGISTER.
17D8  98                TYA
17D9  D002 ^17DD        BNE     GETPNZ          ;IF IT'S 0, MAKE IT 1.
17DB  0901              ORA     #1
17DD  9D481F    GETPNZ: STA     PADFUL,X        ;STOW 1-255 VALUE.
17E0  6A                ROR A                   ;DIVIDE BY 32
17E1  6A                ROR A
17E2  6A                ROR A
17E3  6A                ROR A
```

$650

$750

```
17E4  6A              ROR A
17E5  2907            AND     #$7
17E7  18              CLC
17E8  6901            ADC     #1              ;MAKE IT 1-8.
17EA  9D4C1F          STA     PAD18,X         ;STOW 1-8 VALUE.
17ED  98              TYA
17EE  A000            LDY     #0              ;NOW WE'LL DIVIDE BY 32 TO GET -3 TO +4 VALUE.
17F0  38        SB32: SEC
17F1  E920            SBC     #32
17F3  9004 ^17F9      BCC     HITMIN          ;BOTTOMED OUT
17F5  C8              INY
17F6  4CF017          JMP     SB32
17F9  98        HITMIN: TYA                   ;GET THE COUNT, BROTHER
17FA  38              SEC
17FB  E903            SBC     #3              ;SLIDE TOWARDS THE NEGATIVE.
17FD  9D501F          STA     PADVEC,X        ;STOW 'ER AWAY.
1800  A922            LDA     #$22
1802  20A8FC          JSR     ADELAY          ;TWIDDLE THUMB FOR A WHILE TO ALLOW SAMPLING
1805  60              RTS                     ;CIRCUITRY TO SETTLE.
                      ;
                      ; APLOC - THIS ROUTINE TAKES THE VALUES READ FROM THE PADDLES AND APPLIES
                      ;         THEM 'LOCALLY'. 'LOCALLY' MEANS THAT ONLY THE REGISTERS THAT ARE
                      ;         DEPENDENT ON THE PADDLES ARE AFFECTED.
                      ; ---------------------------------------------------------------------
                      ;
1806  AE651F  APLOC:  LDX     TAMFLG          ;WHAT IS BRUSH SIZING MODE?
1809  3014 ^181F      BMI     APLNPD
180B  BD471F          LDA     PADFUL-1,X      ;IT'S THE PADDLES ! WHOPEE !
180E  CD911F          CMP     TBSPTR
1811  B003 ^1816      BCS     APLOK1          ; PADDLE )= TBSPTR
1813  AD911F          LDA     TBSPTR
1816  8D2A1F  APLOK1: STA     MAXPTS
1819  8D2B1F          STA     NUMPTS
181C  20AD1B          JSR     TSZDSP
181F  AE631F  APLNPD: LDX     SAMFLG          ;WHAT IS THE STROKE SIZING MODE?
1822  3011 ^1835      BMI     APLNP1
1824  BD471F          LDA     PADFUL-1,X      ;IT'S THE PADDLES.
1827  CD921F          CMP     BSPTR
182A  B003 ^182F      BCS     APLOK2
182C  AD921F          LDA     BSPTR
182F  8D2E1F  APLOK2: STA     SNMPTS
1832  208A1B          JSR     SSZDSP
1835  AE761F  APLNP1: LDX     COLFLG          ;WHAT'S THE COLOR SELECTION MODE?
1838  F00A ^1844      BEQ     APLNP2
183A  BD4B1F          LDA     PAD18-1,X       ;IT'S THE PADDLES, BOOHOO.
183D  AA              TAX                     ;LOOK UP THE COLOR
183E  BD171F          LDA     DCLOOK-1,X
1841  20820F          JSR     COLCKB          ;DO THE COLOR CHANGE
1844  AD851F  APLNP2: LDA     QSTXEQ          ;ARE WE DOING QUICK STROKE?
1847  F03C ^1885      BEQ     APLNQS          ;NOPE
1849  AC581F          LDY     SPTR            ;CHECK IF WE'RE DONE QUICK STROKE.
184C  CC2E1F          CPY     SNMPTS
184F  9077 ^18C8      BCC     APLEXT          ;NOPE
1851  AD851F          LDA     QSTXEQ          ;ARE WE EXECUTING QUICKSTROKE TYPE 2.
1854  1003 ^1859      BPL     *0+5            ;NOPE
```

```
1856  20C414            JSR    PGORGE        ;YES, GO BACK TO STARTING SCREEN LOCATION
1859  A000              LDY    #0
185B  8C851F            STY    QSTXEQ        ;TURN OF DOING QUICKSTROKE FLAG.
185E  AC921F            LDY    BSPTR
1861  8C581F            STY    SPTR          ;SET STROKE BUFFER TO BEG OF CURRENT STROKE.
1864  AD961F            LDA    VISHLD        ;RESTORE VISUALIZE MODE FLAG
1867  3003 ^186C        BMI    APLNVI
1869  20D210            JSR    VERHPT        ;TURN VISUALIZE BACK ON
186C  AD951F      APLNVI: LDA    LOCHLD        ;RESTORE LOCATE FLAG
186F  3003 ^1874        BMI    APLNL2
1871  203911            JSR    LOCON
1874  AD901F      APLNL2: LDA    SPDHLD        ;RESTORE FORMER SPEED
1877  8D3E1F            STA    XCHAR1
187A  20D40F            JSR    UPDSPD
187D  ADA61F            LDA    DRWHLD        ;RESTORE BRUSH UP/DOWN FLAG.
1880  1003 ^1885        BPL    APLNQS        ;BRUSH WAS ON, LEAVE IT ON.
1882  208010            JSR    DTRNOF
1885  AD6B1F      APLNQS: LDA    LOCFLG        ;ARE WE IN LOCATE MODE?
1888  301E ^18A8        BMI    APLNLO        ;NOPE
188A  AD6C1F            LDA    CURLOC        ;ARE PADDLES DOING THE LOCATION?
188D  D019 ^18A8        BNE    APLNLO        ;NOPE, KB IS. USEX & USEY HAVE ALREADY BEEN
                  ;                           ;FIGURED.
188F  AD891F            LDA    ORGFLG        ;IF COMMAND WAS GIVEN TO RE-ORIGINATE
1892  D034 ^18C8        BNE    APLEXT        ;WHILE ENTERING PATTERN, THEN DON'T RUIN
                  ;                           ;THAT VECTOR WITH LOCATE VECTOR.
1894  AD501F            LDA    PADVEC        ;GET X VECTOR FROM PADDLE 1.
1897  8D441F            STA    USEX
189A  AD511F            LDA    PADVEC+1      ;GET Y VECTOR FROM PADDLE 2.
189D  49FF              EOR    #$FF           ;NEGATE IT
189F  18                CLC
18A0  6901              ADC    #1
18A2  8D451F            STA    USEY
18A5  4CC818            JMP    APLEXT
                  ;
18A8  AD5B1F      APLNLO: LDA    CURSRC        ;ARE PADDLES CURRENT STROKE?
18AB  D01B ^18C8        BNE    APLEXT
18AD  AD741F            LDA    XCRUISE       ;YES. IS X OVERRIDE ON?
18B0  1006 ^18B8        BPL    APLXON        ;YUP, PADDLE HAS BEEN OVERIDDEN.
18B2  AD501F            LDA    PADVEC        ;NOPE, USE PADDLE VALUE FOR X VECTOR.
18B5  8D461F            STA    BUSEX
18B8  AD751F      APLXON: LDA    YCRUISE
18BB  100B ^18C8        BPL    APLEXT
18BD  AD511F            LDA    PADVEC+1
18C0  49FF              EOR    #$FF           ;NEGATE
18C2  18                CLC
18C3  6901              ADC    #1
18C5  8D471F            STA    BUSEY
18C8  60          APLEXT: RTS
                  ;
                  ;
                  ; GETVEC - THIS ROUTINE TAKES THE DATA FROM THE VARIOUS REGISTERS SET UP
                  ;         BY THE KB HITS AND READING OF THE PADDLES, AND APPLIES IT,
                  ;         COMING UP WITH A VECTOR, (USEX, USEY) TO BE PROCESSED BY
                  ;         SAVVEC AND THEN POSSIBLY PASSED ONTO APPLICATION TO A
                  ;         TARGET.
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                        ; ---------------------------------------------------------------
                        ;
18C9  A900        GETVEC: LDA     #0              ;CLEAR UPDATE STROKE BUFFER FLAG THAT SAVVEC
18CB  8D861F              STA     STKFLG          ;WILL BASE SOME DECISIONS ON.
18CE  AD611F              LDA     HCOUNT          ;DON'T UPDATE IF WE'RE NOT ABOUT TO EXECUTE
18D1  F003 ^18D6          BEQ     GTVDOK          ;MAIN LOOP.
18D3  4C6419      GTVESC: JMP     GTVBYE          ;LET'S GET THE FUCK OUT OF HERE.
18D6  AD851F      GTVDOK: LDA     QSTXEQ          ;DON'T UPDATE IF WE'RE DOING A QUICKSTROKE.
18D9  F013 ^18EE          BEQ     GTVNQS          ;NOT DOING A QUICK STROKE
18DB  AC581F              LDY     SPTR            ;WE'RE DOING A QUICKSTROKE, LET'S GET THE
18DE  B174                LDA     [BBASEX],Y      ;NEXT VECTOR FROM THE STROKE BUFFER.
18E0  8D441F              STA     USEX
18E3  B176                LDA     [BBASEY],Y
18E5  8D451F              STA     USEY
18E8  EE581F              INC     SPTR
18EB  4C6419              JMP     GTVBYE
18EE  AD891F      GTVNQS: LDA     ORGFLG          ;ORIGINATE IN PATTERN COMMAND GIVEN?
18F1  F00F ^1902          BEQ     GTVNOR          ;NOPE
18F3  AD8A1F              LDA     ORIGX           ;GET VECTOR PREPARED BY THE EGORGE ROUTINE.
18F6  8D441F              STA     USEX
18F9  AD8B1F              LDA     ORIGY
18FC  8D451F              STA     USEY
18FF  4C6419              JMP     GTVBYE          ;THAT'S ALL FOLKS.
1902  AD6B1F      GTVNOR: LDA     LOCFLG          ;DON'T UPDATE IF IN LOCATE MODE.
1905  10CC ^18D3          BPL     GTVESC          ;GET OUT, WE ALREADY HAVE A LOCATE VECTOR.
1907  AD671F              LDA     FRZFLG          ;DONT UPDATE IF FREEZE IS ON.
190A  1008 ^1914          BPL     GTVNFR
190C  AD701F              LDA     QSTFLG          ;IS QUICK MODE ON?
190F  3003 ^1914          BMI     GTVNFR          ;NOPE
1911  EE861F              INC     STKFLG          ;OK, WE'LL DO IT.
1914  AD5B1F      GTVNFR: LDA     CURSRC
1917  F03F ^1958          BEQ     GETVEX
1919  AC871F              LDY     OPTR            ;CURRENT STROKE SOURCE IS A PATTERN, LET'S GET
191C  B16C                LDA     [SBASEX],Y
191E  AA                  TAX
191F  B16E                LDA     [SBASEY],Y
1921  CC881F              CPY     ONMPTS          ;A VECTOR FROM IT. FIRST CHECK TO MAKE SURE
1924  9005 ^192B          BCC     STLOK           ;WE'RE NOT PAST END OF SOURCE PATTERN.
1926  A0FF                LDY     #255
1928  8C871F              STY     OPTR
192B  A8          STLOK:  TAY
192C  AD671F              LDA     FRZFLG          ;IF WE'RE FROZEN, THEN DON'T INCREMENT PTR
192F  1003 ^1934          BPL     GTVNI           ;TO SOURCE PATTERN.
1931  EE871F              INC     OPTR            ;SO WE GET THE NEXT VECTOR NEXT TIME.
1934  AD721F      GTVNI:  LDA     XNEG            ;IS NEGATE X ON?
1937  3005 ^193E          BMI     GETNNX          ;NEGATE X IS NOT ON.
1939  8A                  TXA
193A  49FF                EOR     #$FF            ;NEGATE IT
193C  AA                  TAX
193D  E8                  INX
193E  AD731F      GETNNX: LDA     YNEG
1941  3005 ^1948          BMI     GETNNY
1943  98                  TYA
1944  49FF                EOR     #$FF
1946  A8                  TAY
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1947  C8              INY
1948  AD741F  GETNNY: LDA   XCRUISE        ;HOLD X ON?
194B  1003 ^1950       BPL   GETVCX        ;YES, BUSEX HAS BEEN SET BY PRIOR KB HITS.
194D  8E461F           STX   BUSEX
1950  AD751F  GETVCX: LDA   YCRUISE
1953  1003 ^1958       BPL   GETVEX
1955  8C471F           STY   BUSEY
1958  AD461F  GETVEX: LDA   BUSEX         ;SO DON'T TRASH THEM OUT NOW.
195B  8D441F           STA   USEX
195E  AD471F           LDA   BUSEY
1961  8D451F           STA   USEY
1964  60       GTVBYE: RTS
                ;
                ; SAVVEC - SAVE VECTOR IN STROKE BUFFER IF IN VISUALIZE MODE;
                ;         GET VECTOR OUT OF STROKE BUFFER IN EXECUTING A QUICK
                ;         STROKE. IN ANY CASE, EXIT WITH USEX & USEY.
                ; ---------------------------------------------------------------
                ;
1965  AC581F  SAVVEC: LDY   SPTR          ;GET HOOK INTO STROKE BUFFE
1968  AD6D1F         LDA   VISFLG        ;VISUALIZE ON?
196B  3066 ^19D3     BMI   SVVNVI        ;NOPE
196D  AD861F         LDA   STKFLG        ;SHOULD WE UPDATE THE STROKE BUFFER?
1970  F030 ^19A2     BEQ   SVVNUP        ;NOPE
1972  AD5B1F         LDA   CURSRC        ;IF CURRENT STROKE IS A PATTERN, THEN DON'T
1975  D008 ^197F     BNE   SVVNPD        ;IGNORE 0 VECTORS.
1977  AD461F         LDA   BUSEX         ;NOW CHECK TO MAKE SURE THAT VECTOR IS
197A  0D471F         ORA   BUSEY         ;NON-ZERO. CAUSE WE DON'T WANT TO ENTER
197D  F023 ^19A2     BEQ   SVVNUP        ;ZERO VECTORS. BRANCH IF ZERO.
197F  206E1C  SVVNPD: JSR   LSTERA        ;ERASE LAST VISUALIZATION
1982  AC581F         LDY   SPTR
1985  AD461F         LDA   BUSEX
1988  9174           STA   [BBASEX],Y
198A  AD471F         LDA   BUSEY
198D  9176           STA   [BBASEY],Y
198F  EE581F         INC   SPTR
1992  CC2E1F         CPY   SNMPTS        ;PAST END?
1995  900B ^19A2     BCC   SVVNUP
1997  A000           LDY   #0            ;YUP, REINIT ALL PTRS.
1999  8C871F         STY   OPTR          ;SOURCE PATTERN
199C  AC921F         LDY   BSPTR
199F  8C581F         STY   SPTR
19A2  20EB1A  SVVNUP: JSR   USEDSP       ;DISPLAY VECTOR TO BE APPLIED
19A5  A574           LDA   BBASEX
19A7  18             CLC                 ;NOW SET UP FOR DISPLAY OF VISUALIZATION.
19A8  6D921F         ADC   BSPTR
19AB  8570           STA   CBASEX        ;WE ONLY WANT TO SHOW THAT PORTION OF THE
19AD  A575           LDA   BBASEX+1      ;STROKE TO THE RIGHT OF BSPTR.
19AF  8571           STA   CBASEX+1
19B1  A576           LDA   BBASEY
19B3  18             CLC
19B4  6D921F         ADC   BSPTR
19B7  8572           STA   CBASEY
19B9  A577           LDA   BBASEY+1
19BB  8573           STA   CBASEY+1
19BD  AD2E1F         LDA   SNMPTS
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19C0  38              SEC
19C1  ED921F          SBC     BSPTR
19C4  8D2F1F          STA     CURPTS
19C7  CD2C1F          CMP     LNMPTS          ;IF IT'S NOT THE SAME # OF PTS WE DISPLAYED
19CA  F006 ^19D2      BEQ     SVVNC1          ;LAST TIME, THEN SET THE CHANGE FLAG.
19CC  208A1B          JSR     SSZDSP
19CF  EE7F1F          INC     CHGFLG
19D2  60        SVVNC1: RTS
                ;
19D3  20EB1A    SVVNVI: JSR     USEDSP          ;DISPLAY WHAT WE WILL APPLY
19D6  A568            LDA     TBASEX          ;SET UP FOR DISPLAY OF BRUSH
19D8  18              CLC
19D9  6D911F          ADC     TBSPTR
19DC  8570            STA     CBASEX
19DE  A569            LDA     TBASEX+1
19E0  8571            STA     CBASEX+1
19E2  A56A            LDA     TBASEY
19E4  18              CLC
19E5  6D911F          ADC     TBSPTR
19E8  8572            STA     CBASEY
19EA  A56B            LDA     TBASEY+1
19EC  8573            STA     CBASEY+1
19EE  AD2B1F          LDA     NUMPTS
19F1  38              SEC
19F2  ED911F          SBC     TBSPTR
19F5  8D2F1F          STA     CURPTS
19F8  CD2C1F          CMP     LNMPTS          ;IF WE'RE NOT DISPLAYING SAME # OF PTS AS
19FB  F006 ^1A03      BEQ     SVVNC2          ;LAST TIME, THEN SET THE CHANGE FLAG.
19FD  20AD1B          JSR     TSZDSP
1A00  EE7F1F          INC     CHGFLG
1A03  60        SVVNC2: RTS
                ;
                ;
                ;
                ; WRTEXT - WRITE TEXT OF CTL DISPLAY INTO BOTTOM 4 LINES OF TEXT SCREEN,
                ;          PROVIDED THAT TXTFLG IS SET APPROPRIATELY.
                ; ---------------------------------------------------------------------
                ;
1A04  2084FE    WRTEXT: JSR     SETNRM          ;SET DISPLAY TEXT MODE = NORMAL
1A07  AD821F          LDA     TXTFLG          ;GET TEXT WRITING DIRECTIONS
1A0A  8D831F          STA     CTXFLG          ;WHAT WE ARE DIRECTED TO WRITE CAN BE RELIED ON
1A0D  3005 ^1A14      BMI     WRTOP2          ;WRITE TOP 2 LINES ONLY.
1A0F  D006 ^1A17      BNE     WRNONE          ;WRITE NO LINES
1A11  20321A          JSR     WRCTL2          ;WRITE BOTTOM 2 LINES
1A14  20181A    WRTOP2: JSR     WRCTL1          ;WRITE TOP 2 LINES.
1A17  60        WRNONE: RTS
                ;
                ; WRCTL 1 & 2 - WRITE TOP & BOTTOM 2 PAIRS OF LINES.
                ; --------------------------------------------------
                ;
1A18  A000      WRCTL1: LDY     #0              ;MOVE CURSOR TO LEFT MARGIN
1A1A  8424            STY     CURSRX
1A1C  A914            LDA     #20             ;START ON ROW 21 (OF 24).
1A1E  8525            STA     CURSRY
1A20  2022FC          JSR     CURSET          ;SET UP POINTERS (THANKS APPLE)
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1A23  B94C1A      WRTLP1: LDA     TXBUF1,Y
1A26  F009 ^1A31          BEQ     WRDN1           ;0 MARKS LAST CHARACTER
1A28  09C0                ORA     #$C0            ;APPLE-FY IT.
1A2A  20F0FD              JSR     COUT1
1A2D  C8                  INY
1A2E  4C231A              JMP     WRTLP1
1A31  60          WRDN1:  RTS
                  ;
1A32  A000        WRCTL2: LDY     #0
1A34  8424                STY     CURSRX
1A36  A916                LDA     #22             ;START ON ROW 23 (OF 24).
1A38  8525                STA     CURSRY
1A3A  2022FC              JSR     CURSET
1A3D  B99C1A      WRTLP2: LDA     TXBUF2,Y
1A40  F009 ^1A4B          BEQ     WRDN2
1A42  09C0                ORA     #$C0
1A44  20F0FD              JSR     COUT1
1A47  C8                  INY
1A48  4C3D1A              JMP     WRTLP2
1A4B  60          WRDN2:  RTS
                  ;
1A4C  282D585858  TXBUF1: DB      '(-XXX-YYY) (-XXX-YYY) BRSIZ XXX SSIZ XXX'
1A74  5649535541          DB      'VISUALIZE V  LOCATE L    STOP    PAINT '
1A9B  00                  DB      0
                  ;
1A9C  515549434B  TXBUF2: DB      'QUICKMODE Q KB-HOLD Z/X COLOR X BRS-UP U'
1AC4  5752415041          DB      'WRAPAROND W REVERSE ,/.  MAKE M  PMODE'
1AEA  00                  DB      0
                  ;
                  ;     ROUTINES TO DISPLAY COORDINATES/DISPLACEMENTS
                  ;     ---------------------------------------------
                  ;
1AEB  AD471F      USEDSP: LDA     BUSEY
1AEE  AE461F              LDX     BUSEX
1AF1  CD321F              CMP     LBUSY
1AF4  D005 ^1AFB          BNE     USEDF           ;IT'S DIFFERENT, LET'S DISPLAY IT
1AF6  EC311F              CPX     LBUSX
1AF9  F016 ^1B11          BEQ     USEDEX
1AFB  A280        USEDF:  LDX     #$80
1AFD  8EA31F              STX     NUMMSK
1B00  AD471F              LDA     BUSEY
1B03  AE461F              LDX     BUSEX
1B06  8D321F              STA     LBUSY
1B09  8E311F              STX     LBUSX
1B0C  A001                LDY     #TXUSD
1B0E  20C91B              JSR     XYPRI
1B11  60          USEDEX: RTS
                  ;
1B12  AD991F      BASDSP: LDA     SCSTRX
1B15  CD331F              CMP     LBASX
1B18  D018 ^1B32          BNE     BASDF
1B1A  AD9A1F              LDA     SCSTRX+1
1B1D  CD341F              CMP     LBASX+1
1B20  D010 ^1B32          BNE     BASDF
1B22  AD9B1F              LDA     SCSTRY
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```
1B25  CD351F            CMP     LBASY
1B28  D008 ^1B32        BNE     BASDF
1B2A  AD9C1F            LDA     SCSTRY+1
1B2D  CD361F            CMP     LBASY+1
1B30  F050 ^1B82        BEQ     BASDEX
1B32  AD821F      BASDF: LDA    TXTFLG
1B35  C901              CMP     #1
1B37  F049 ^1B82        BEQ     BASDEX          ;OOPS WE'RE NOT SUPPOSED TO WRITE TEXT.
1B39  A080              LDY     #$80
1B3B  AE9A1F            LDX     SCSTRX+1
1B3E  8E341F            STX     LBASX+1
1B41  F007 ^1B4A        BEQ     BASXIN
1B43  ADA21F            LDA     OFFLAG          ;IF SOME POINTS ARE STILL ON SCREEN, THEN
1B46  D002 ^1B4A        BNE     BASXIN          ;DON'T DISPLAY X OR Y IN INVERSE.
1B48  A000              LDY     #$00
1B4A  8CA31F      BASXIN: STY   NUMMSK          ;STORE NORMAL/INVERT PRINT MASK
1B4D  AD991F            LDA     SCSTRX
1B50  8D331F            STA     LBASX
1B53  A00C              LDY     #TXBSE
1B55  20F21B            JSR     PRSIGN          ;PRINT SIGN & TAKE ABS VALUE
1B58  201C1C            JSR     DCBYTE
1B5B  A080              LDY     #$80
1B5D  AE9C1F            LDX     SCSTRY+1
1B60  8E361F            STX     LBASY+1
1B63  D005 ^1B6A        BNE     BASYOT
1B65  AD9B1F            LDA     SCSTRY          ;CHECK HIGH BIT OF Y FOR ) 127.
1B68  1007 ^1B71        BPL     BASYIN
1B6A  ADA21F      BASYOT: LDA   OFFLAG
1B6D  D002 ^1B71        BNE     BASYIN
1B6F  A000              LDY     #$0             ;PRINT IT IN INVERSE.
1B71  8CA31F      BASYIN: STY   NUMMSK
1B74  AD9B1F            LDA     SCSTRY
1B77  8D351F            STA     LBASY
1B7A  A010              LDY     #TXBSE+4
1B7C  20F21B            JSR     PRSIGN
1B7F  201C1C            JSR     DCBYTE
1B82  60          BASDEX: RTS
                  ;
1B83  AC2E1F      SSZDF:  LDY   SNMPTS
1B86  C8                INY                     ;FORCE LSNMPT TO BE DIFFERENT
1B87  8C381F            STY     LSNMPT
1B8A  AD2E1F      SSZDSP: LDA   SNMPTS
1B8D  38                SEC
1B8E  ED921F            SBC     BSPTR
1B91  CD381F            CMP     LSNMPT
1B94  F00F ^1BA5        BEQ     SSZEXT
1B96  8D381F            STA     LSNMPT
1B99  A025              LDY     #TXSSZ
1B9B  A280              LDX     #$80
1B9D  8EA31F            STX     NUMMSK
1BA0  A200              LDX     #$00
1BA2  201C1C            JSR     DCBYTE
1BA5  60          SSZEXT: RTS
                  ;
1BA6  AC2B1F      TSZDF:  LDY   NUMPTS
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```
1BA9  C8                INY
1BAA  8C371F            STY     LNUMPT
1BAD  AD2B1F      TSZDSP: LDA     NUMPTS
1BB0  38                SEC
1BB1  ED911F            SBC     TBSPTR
1BB4  CD371F            CMP     LNUMPT
1BB7  F00F ^1BC8        BEQ     TSZEXT
1BB9  8D371F            STA     LNUMPT
1BBC  A01C              LDY     #TXTSZ
1BBE  A280              LDX     #$80
1BC0  8EA31F            STX     NUMMSK
1BC3  A200              LDX     #0
1BC5  201C1C            JSR     DCBYTE
1BC8  60          TSZEXT: RTS
                  ;
1BC9  48          XYPRI:  PHA
1BCA  AD821F              LDA     TXTFLG
1BCD  C901                CMP     #1              ;OK TO WRITE IN TEXT AREA?
1BCF  F01E ^1BEF          BEQ     XYEXT           ;NOPE
1BD1  8A                  TXA                     ;Y=DISPLAY POSITION
1BD2  48                  PHA                     ;A=DELTAY Y, X=DELTA X
1BD3  A200                LDX     #0              ;ASSUME POSITIVE 8 BIT #
1BD5  68                  PLA
1BD6  1002 ^1BDA          BPL     *0+4            ;YES, IT'S POSITIVE
1BD8  A203                LDX     #3              ;NEGATIVE, ADD CORRESPONDING HIGH ORDER BITS
1BDA  20F21B              JSR     PRSIGN          ;DO THE X COORD
1BDD  201C1C              JSR     DCBYTE
1BE0  C8                  INY
1BE1  A200                LDX     #0              ;ASSUME POSITIVE 8 BIT #
1BE3  68                  PLA
1BE4  1002 ^1BE8          BPL     *0+4            ;YES, IT'S POSITIVE
1BE6  A203                LDX     #3              ;NEGATIVE, ADD CORRESPONDING HIGH ORDER BITS
1BE8  20F21B              JSR     PRSIGN          ;DO THE Y COORD
1BEB  201C1C              JSR     DCBYTE
1BEE  60          DONXYP: RTS
1BEF  68          XYEXT:  PLA
1BF0  60                  RTS
                  ;
1BF1  AD                  DB      $AD ;==FLAK
                  ;
                  ;
                  ;
1BF2  48          PRSIGN: PHA                     ;PRSIGN EVALUATES 10 BIT SIGNED INTEGER.
1BF3  8A                  TXA                     ;PRINTS '+' OR '-', DEPENDING ON SIGN.
1BF4  2902                AND     #2              ;RETURNS WITH 10 BIT ABSOLUTE VALUE.
1BF6  D00A ^1C02          BNE     NEGNUM          ;HIGH ORDER IN X, LOW ORDER IN A.
1BF8  A92B                LDA     #$2B            ;AN INVERSE '+'
1BFA  0DA31F              ORA     NUMMSK          ;OR IN NORMAL/INVERSE MASK
1BFD  9164                STA     [CPAGE1],Y      ;DISPLAY IT
1BFF  C8                  INY
1C00  68                  PLA
1C01  60                  RTS
1C02  A92D        NEGNUM: LDA     #$2D            ;AN INVERSE '-'
1C04  0DA31F              ORA     NUMMSK
1C07  9164                STA     [CPAGE1],Y
```

```
1C09  C8              INY
1C0A  68              PLA                 ;NOW TO NEGATE THE 10 BIT.
1C0B  49FF            EOR   #$FF          ;COMPLEMENT
1C0D  18              CLC
1C0E  6901            ADC   #1            ;AND INCREMENT (ALA PDP-8)
1C10  48              PHA
1C11  8A              TXA                 ;GET HIGH ORDER
1C12  49FF            EOR   #$FF          ;THE SAME ORDEAL
1C14  6900            ADC   #0            ;DON'T ADD ONE, IT WOULD BE IN THE CARRY.
1C16  2903            AND   #3
1C18  AA              TAX                 ;PUT HIGH ORDER BACK
1C19  68              PLA                 ;GET LOW ORDER
1C1A  60              RTS
                ;
1C1B  AD              DB    $AD ;==FLAK
                ;
                ;
                ;   DCBYTE - PRINT 10 BIT HEX # IN DECIMAL - PLUS #'S ONLY
                ;   ------------------------------------------------------
                ;
1C1C  48        DCBYTE: PHA               ;FIRST LET'S FIGURE OUT IF WE'RE
1C1D  AD821F            LDA   TXTFLG      ;SUPPOSED TO BE WRITING IN TEXT AREA.
1C20  C901              CMP   #1          ;OK TO WRITE IN TOP LINE?
1C22  F048 ^1C6C        BEQ   DCNDIG      ;NOPE
1C24  A930              LDA   #$30
1C26  0DA31F            ORA   NUMMSK      ;FOR INVERSE/NORMAL '0' THRU '9'
1C29  8D3D1F            STA   TMPNUM      ;WE'LL INCREMENT THIS
1C2C  8D7E1F            STA   TEMP
1C2F  68                PLA
1C30  38        DCSUB1: SEC               ;JUST IN CASE WE NEED SEC
1C31  E964              SBC   #100
1C33  B003 ^1C38        BCS   DCNCC1      ;CARRY STILL SET, NO BORROW.
1C35  CA                DEX               ;DECRMENT HIGH ORDER
1C36  3006 ^1C3E        BMI   DCOUT1      ;GONE BELOW 0?
1C38  EE3D1F    DCNCC1: INC   TMPNUM
1C3B  4C301C            JMP   DCSUB1      ;GO SUB ANOTHER 100
1C3E  48        DCOUT1: PHA
1C3F  AD3D1F            LDA   TMPNUM
1C42  9164              STA   [CPAGE1],Y    ;DISPLAY IT
1C44  C8                INY
1C45  68                PLA
1C46  6964              ADC   #100
1C48  AE7E1F            LDX   TEMP        ;ANOTHER '0' - FOR THE TENS
1C4B  38        DCSUB2: SEC
1C4C  E90A              SBC   #10
1C4E  9004 ^1C54        BCC   DCOUT2
1C50  E8                INX
1C51  4C4B1C            JMP   DCSUB2
1C54  48        DCOUT2: PHA
1C55  8A                TXA
1C56  9164              STA   [CPAGE1],Y
1C58  C8                INY
1C59  68                PLA
1C5A  690A              ADC   #10
1C5C  AE7E1F            LDX   TEMP
```

```
1C5F  38          DCSUB3: SEC
1C60  E901                SBC     #1
1C62  9004 ^1C68          BCC     DCOUT3
1C64  E8                  INX
1C65  4C5F1C              JMP     DCSUB3
1C68  8A          DCOUT3: TXA
1C69  9164                STA     [CPAGE1],Y
1C6B  60                  RTS
1C6C  68          DCNDIG: PLA
1C6D  60                  RTS
                  ;
                  ;
                  ;    LSTERA - ERASE LAST THING WE DREW,
                  ;             REPLACING WHAT WAS THERE.
                  ;    ---------------------------------
                  ;
1C6E  AD301F      LSTERA: LDA     ERSFLG          ;DON'T ERASE IF ERASE FLAG NOT ON.
1C71  1045 ^1CB8          BPL     DONER0
1C73  AD2C1F              LDA     LNMPTS          ;GET LAST # POINTS PLOTTED.
1C76  F036 ^1CAE          BEQ     DONERX          ;DON'T DO IT IF THERE'S NOTHING TO ERASE
1C78  8D3D1F              STA     TMPNUM
1C7B  AE391F              LDX     LASTSX          ;GET LAST (X,Y) PLOTTED AT. WE'LL
1C7E  AD3A1F              LDA     LASTSY          ;WORK BACKWARD FROM THERE.
1C81  48                  PHA
1C82  AC3D1F      ELOOP:  LDY     TMPNUM
1C85  B90065              LDA     LSTBYT,Y        ;GET BYTE THAT CONTAINED PIXEL THAT WAS THERE
1C88  8D7E1F              STA     TEMP
1C8B  68                  PLA
1C8C  A8                  TAY
1C8D  48                  PHA
1C8E  209E1D              JSR     HPOS            ;GET ADDRESS OF WHERE BYTE WAS IN MEMORY.
1C91  AD7E1F              LDA     TEMP
1C94  9160                STA     [FROM],Y        ;PUT'ER BACK
1C96  CE3D1F              DEC     TMPNUM
1C99  AC3D1F              LDY     TMPNUM
1C9C  F00F ^1CAD          BEQ     DONERA          ;WE'RE DONE
1C9E  68                  PLA                     ;RESTORE Y
1C9F  38                  SEC
1CA0  F172                SBC     [CBASEY],Y      ;GET TO PREVIOUS Y.
1CA2  297F                AND     #$7F            ;TAKE CARE OF WRAPAROUND
1CA4  48                  PHA
1CA5  8A                  TXA                     ;NOW DO SAME FOR X.
1CA6  38                  SEC
1CA7  F170                SBC     [CBASEX],Y
1CA9  AA                  TAX
1CAA  4C821C              JMP     ELOOP
1CAD  68          DONERA: PLA
1CAE  A900        DONERX: LDA     #$0
1CB0  8D301F              STA     ERSFLG          ;TURN OFF ERASE FLAG, WE DID IT.
1CB3  A901                LDA     #1              ;IF WE ACTUALLY ERASED, THEN SET CHANGE
1CB5  8D7F1F              STA     CHGFLG          ;ON SO THAT PATTERN WILL BE REDRAWN.
1CB8  60          DONER0: RTS
                  ;
                  ; WRAPAT - PATCH THE DRAW ROUTINE SO IT TAKES CARE
                  ;          WRAPAROUND LIKE WE'VE BEEN DIRECTED.
```

```
                ; ---------------------------------------------
                ;
1CB9  AD981F    WRAPAT: LDA     WRPIND          ;WHAT'S THE FLAG SAY?
1CBC  3006 ^1CC4        BMI     WARPOF          ;IT SEZ NO WRAPAROUND!!
1CBE  A938              LDA     #INSSEC         ;SET PATCH LOC TO SEC
1CC0  8D031D            STA     DRWPAT
1CC3  60                RTS
1CC4  A918      WARPOF: LDA     #INSCLC         ;SET PATCH LOC TO CLC
1CC6  8D031D            STA     DRWPAT
1CC9  60                RTS
                ;
      = 0038    INSSEC: EQU     $38
      = 0018    INSCLC: EQU     $18
                ;
                ; DRAWIT - DRAW THE CURRENT PATTERN
                ; --------------------------------
                ;
1CCA  AD2F1F    DRAWIT: LDA     CURPTS          ;SKIP OUT IF THERE'S NO PATTERN TO DRAW
1CCD  D003 ^1CD2        BNE HAVSUM
1CCF  4C631D            JMP     DONDRW
1CD2  A901      HAVSUM: LDA     #1
1CD4  8D3D1F            STA     TMPNUM          ;INIT POINT COUNTER
1CD7  A900              LDA     #0              ;CLEAR COUNT OF POINTS PLOTTED ON SCREEN
1CD9  8DA11F            STA     PTCNT
1CDC  AE991F            LDX     SCSTRX          ;WE'LL USE THE 10 BIT SCREEN LOCATION
1CDF  8E9D1F            STX     SDSTRX          ;WHILE DRAWING, SO WE CAN TELL WHEN WE HAVE
1CE2  AE9A1F            LDX     SCSTRX+1        ;WRAPPED AROUND.
1CE5  8E9E1F            STX     SDSTRX+1
1CE8  AC9B1F            LDY     SCSTRY
1CEB  8C9F1F            STY     SDSTRY
1CEE  AC9C1F            LDY     SCSTRY+1
1CF1  8CA01F            STY     SDSTRY+1
1CF4  AD9F1F    DLOOP:  LDA     SDSTRY
1CF7  297F              AND     #$7F            ;KEEP Y < 127 WHEN LOOKING IN TABLE
1CF9  A8                TAY
1CFA  AE9D1F            LDX     SDSTRX
1CFD  209E1D            JSR     HPOS            ;FIND WHERE PIXEL RESIDES IN MEMORY
1D00  B160              LDA     [FROM],Y        ;GET BYTE THAT'S THERE RIGHT NOW
1D02  48                PHA                     ;AND HOLD ON TO IT.
1D03  18        DRWPAT: CLC                     ;THIS LOCATION GETS PATCHED TO A SEC/CLC BY
                ;                               ;THE WRAPAT ROUTINE. WHEN WRAPAROUND IS ON,
                ;                               ;WE DON'T BOTHER CHECKING.
1D04  B015 ^1D1B        BCS     DRWDO
1D06  ADA01F            LDA     SDSTRY+1        ;SEE IF ANY HIGH ORDER BITS ARE ON
1D09  0D9E1F            ORA     SDSTRX+1
1D0C  D005 ^1D13        BNE     DRWNDO          ;IF SO, WE'RE OFF THE SCREEN.
1D0E  AD9F1F            LDA     SDSTRY          ;SEE IF Y > 127
1D11  1008 ^1D1B        BPL     DRWDO           ;<=127
1D13  ADA21F    DRWNDO: LDA     OFFLAG          ;SYSTEM WRAP FLAG ON?
1D16  D009 ^1D21        BNE     DRWNPL          ;NO - ONLY PLOT POINTS THAT ARE ON SCREEN.
1D18  4C1E1D            JMP     DRWDO+3         ;YES - PLOT ALL POINTS, BUT ONLY COUNT THOSE ON
1D1B  EEA11F    DRWDO:  INC     PTCNT           ;INCR # POINTS WITHIN SCREEN BOUNDS.
1D1E  20AC1D            JSR     HPLOT           ;OK, PLOT THE PIXEL.
1D21  AC3D1F    DRWNPL: LDY     TMPNUM          ;GET COUNTER/POINTER
1D24  68                PLA                     ;GET OUR PREVIOUS BYTE BACK
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1D25  990065            STA     LSTBYT,Y        ;AND STORE IT IN ERASE ARRAY.
1D28  CC2F1F            CPY     CURPTS          ;ARE WE DONE?
1D2B  F036 ^1D63        BEQ     DONDRW          ;YUP
1D2D  18                CLC
1D2E  A200              LDX     #0              ;DO A 10 BIT ADD FOR X & Y HERE.
1D30  B172              LDA     [CBASEY],Y
1D32  1002 ^1D36        BPL     DRWNM1          ;IT'S NOT A NEG VECTOR
1D34  A203              LDX     #3              ;GET HIGH ORDER BITS FOR NEG VECTOR
1D36  6D9F1F      DRWNM1: ADC   SDSTRY          ;ADD TO OUR CURRENT LOCATION, LOW ORDER
1D39  8D9F1F            STA     SDSTRY
1D3C  8A                TXA                     ;NOW TO ADD THE HIGH ORDER STUFF.
1D3D  6DA01F            ADC     SDSTRY+1
1D40  2903              AND     #3              ;KEEPTO +/- 511
1D42  8DA01F            STA     SDSTRY+1
1D45  A200              LDX     #0
1D47  18                CLC
1D48  B170              LDA     [CBASEX],Y
1D4A  1002 ^1D4E        BPL     DRWNM2          ;IT'S NOT A NEG VECTOR
1D4C  A203              LDX     #3              ;GET HIGH ORDER BITS FOR NEG VECTOR
1D4E  6D9D1F      DRWNM2: ADC   SDSTRX          ;ADD TO OUR CURRENT LOCATION, LOW ORDER
1D51  8D9D1F            STA     SDSTRX
1D54  8A                TXA                     ;NOW TO ADD THE HIGH ORDER STUFF.
1D55  6D9E1F            ADC     SDSTRX+1
1D58  2903              AND     #3              ;KEEPTO +/- 511
1D5A  8D9E1F            STA     SDSTRX+1
1D5D  EE3D1F            INC     TMPNUM
1D60  4CF41C            JMP     DLOOP           ;TIME FOR ANOTHE
1D63  AD9D1F      DONDRW: LDA   SDSTRX
1D66  8D391F            STA     LASTSX          ;REMEMBER LAST (X,Y) PLOTTED SO WE CAN
1D69  AD9F1F            LDA     SDSTRY          ;WORK BACKWARDS FOR ERASURE.
1D6C  297F              AND     #$7F
1D6E  8D3A1F            STA     LASTSY
1D71  A980              LDA     #$80            ;TURN THERE'S SOMETHING THAT YOU MIGHT WANT TO
1D73  8D301F            STA     ERSFLG          ;ERASE FLAG ON...
1D76  AD2F1F            LDA     CURPTS
1D79  8D2C1F            STA     LNMPTS          ;AND REMEMBER HOW MAHY PTS WE DID.
1D7C  60                RTS
                  ;
1D7D  AD                DB      $AD ;==FLAK
                  ;
                  ;
                  ;     HBKGND - DRAW HIRES BACKGROUND
                  ;     ------------------------------
                  ;
1D7E  A920        HBKGND: LDA   #$20             ;WE'RE GONNA FILL DA PAGE
1D80  8561              STA     FROM+1
1D82  A000              LDY     #$0
1D84  8460              STY     FROM
1D86  AD411F      BKLOOP: LDA   HCOLOR
1D89  9160              STA     [FROM],Y
1D8B  C8                INY
1D8C  AD421F            LDA     HCOLR2          ;GET SHIFTED VERSION OF COLOR BYTE
1D8F  9160              STA     [FROM],Y
1D91  C8                INY
1D92  D0F2 ^1D86        BNE     BKLOOP
```

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1D94  E661              INC     FROM+1
1D96  A561              LDA     FROM+1
1D98  291F              AND     #$1F
1D9A  D0EA ^1D86        BNE     BKLOOP
1D9C  60                RTS
                ;
1D9D  AD                DB      $AD ;==FLAK
                ;
                ;
                ; HPLOT - DIGITAL MERCURY'S TABLE DRIVEN HIRES PLOT ROUTINE.
                ;         MUCHO WASTO CORE, BUT IT'S FAST !!
                ;         ON ENTRY, Y HOLDS Y VALUE, Y<128. X HOLDS X, X<256.
                ;         HPOS EXITS WITH ADDRESS OF BYTE CONTAINING THE PIXEL
                ;         IN FROM & Y. HPLOT ORS THE PIXEL INTO THE BYTE.
                ;
1D9E  B90060    HPOS:   LDA     YTAB1,Y         ;GET HIGH ORDER BYTE OF ROW ADDR
1DA1  8561              STA     FROM+1
1DA3  B98060            LDA     YTAB2,Y         ;GET LOW ORDER BYTE
1DA6  8560              STA     FROM
1DA8  BC0061            LDY     XTAB1,X         ;GET OFFSET ON THIS ROW
1DAB  60                RTS
                ;
                ;
1DAC  98        HPLOT:  TYA                     ;IF ON ODD BYTE, THEN USE SHIFTED VERSION
1DAD  4A                LSR     A               ;OF THE COLOR BYTE.
1DAE  AD411F            LDA     HCOLOR
1DB1  9003 ^1DB6        BCC     NOSHFT
1DB3  AD421F            LDA     HCOLR2
1DB6  4CB91D    NOSHFT: JMP     PAINT1          ;THE JUMP LOCATION HERE GETS PATCHED
      = 1DB7    PNTJMP: EQU *0-2
                ;
1DB9  5160      PAINT1: EOR     [FROM],Y        ;NORMAL PAINT MODE
1DBB  3D0062            AND     XTAB2,X         ;ISOLATE BIT FOR OUR PIXEL
1DBE  5160              EOR     [FROM],Y
1DC0  9160              STA     [FROM],Y
1DC2  60                RTS
                ;
1DC3  3160      PAINT2: AND     [FROM],Y        ;NO CHANGE
1DC5  3D0062            AND     XTAB2,X         ;ISOLATE BIT FOR OUR PIXEL
1DC8  1160              ORA     [FROM],Y
1DCA  9160              STA     [FROM],Y
1DCC  60                RTS
                ;
1DCD  48        PAINT3: PHA                     ;BLACK ==) COLORS, COLORS ==) WHITE
1DCE  2980              AND     #$80            ;SAVE COLOR FAMILY
1DD0  8D7E1F            STA     TEMP
1DD3  68                PLA
1DD4  1160              ORA     [FROM],Y
1DD6  297F              AND     #$7F
1DD8  0D7E1F            ORA     TEMP            ;OR IN OUR COLOR FAMILY BIT
1DDB  4CB91D            JMP     PAINT1
                ;
1DDE  48        PAINT4: PHA                     ;WHITE ==) COLORS, COLORS ==) BLACK
1DDF  2980              AND     #$80
1DE1  8D7E1F            STA     TEMP
```

```
1DE4  68          PLA
1DE5  3160        AND     [FROM],Y
1DE7  297F        AND     #$7F
1DE9  0D7E1F      ORA     TEMP
1DEC  4CB91D      JMP     PAINT1
                  ;
1DEF  B160        PAINT5: LDA     [FROM],Y        ;COMPLEMENT WHATEVER'S THERE, IGNORE
                  ;                               ;CURRENT COLOR SETTING.
1DF1  497F        EOR     #$7F            ;RETAIN COLOR FAMILY
1DF3  4CB91D      JMP     PAINT1
                  ;
                  ; HGHCLR - CLEAR HIGH ORDER BITS OF SCREEN LOCATION
                  ;         USED TO GET BRUSH BACK ON SCREEN.
                  ; ---------------------------------------------
                  ;
1DF6  A900        HGHCLR: LDA     #0
1DF8  8D9A1F      STA     SCSTRX+1
1DFB  8D9C1F      STA     SCSTRY+1
1DFE  AD9B1F      LDA     SCSTRY
1E01  297F        AND     #$7F
1E03  8D9B1F      STA     SCSTRY
1E06  60          RTS
```

```
                        ;
                        ; ====================
                        ; PROGRAM REGISTERS
                        ; ====================
1E07  = 1F00                    ORG     $FF00 AND (*0+$100)
1F00  00                REMOTE: DB      $00             ;COUNTER FOR 'REMOTE' CONTROL
1F01  00                REMTMP: DB      $00             ;HOLDS VALUE OF REMOTE DURING EXECUTION
                        ;                               ;ALSO USED BY PROGRAM WHEN RETURN KEY IS HIT.
1F02  00                RCTR1:  DB      $00             ;CH50 WILL RETURN WHEN CTR IS EXHAUSTED
1F03  00                RCTR2:  DB      $00
1F04  00                RCTR3:  DB      $00
1F05  00                TCTR1:  DB      $00             ;THE TCTR SERIES ARE USED TO COUNT THE
1F06  00                TCTR2:  DB      $00             ;NUMBER OF TICKS SINCE THEY WERE LAST
1F07  00                TCTR3:  DB      $00             ;CLEARED.
1F08  2A                COLORS: DB $2A ;GREEEN
1F09  55                        DB $55 ;VIOLET
1F0A  7F                        DB $7F ;WHITE
1F0B  AA                        DB $AA ;ORANGE
1F0C  D5                        DB $D5 ;BLUE
1F0D  80                        DB $80 ;BLACK II
1F0E  FF                        DB $FF ;WHITE II
1F0F  00                        DB      $00     ;BLACK
1F10  = 0008            ACLOOK: DS      8               ;ASCII LOOKUP TABLE FOR CUSTOMIZED COLORS.
1F18  = 0008            DCLOOK: DS      8               ;HEX LOOKUP TABLE FOR CUSTOMIZED COLRS.
1F20  80                SPEEDS: DB      $80             ;THE DELAY COUNT FOR EACH OF THE 8 SPEEDS
1F21  40                        DB      $40
1F22  20                        DB      $20
1F23  10                        DB      $10
1F24  08                        DB      $08
1F25  04                        DB      $04
1F26  02                        DB      $02
1F27  01                        DB      $01
1F28  00                SAVEX   DB $00 ;TEMP X
1F29  00                SAVEY   DB $00 ;TEMP Y
1F2A  00                MAXPTS: DB      $00             ;MAX # PTS TO DISPLAY/ENTER
1F2B  00                NUMPTS: DB      $00             ;# OF PTS TO ENTER/DISPLAY
1F2C  FF                LNMPTS  DB      $FF             ;# OF PTS OF TARGET DRAWN LAST TIME
1F2D  00                SMXPTS: DB      $00             ;MAX # PTS OF STROKE TO ENTER/DISPLAY
1F2E  00                SNMPTS: DB      $00             ;# OF PTS OF STROKE TO CONSIDER
1F2F  00                CURPTS: DB      $00             ;CURRENT # OF PTS TO DISPLAY
1F30  00                ERSFLG: DB      $00         ;ERASE FLAG: WHEN NEG, MEANS ERASE LAST PATTERN
                                                    ;DRAWN WITH WHAT WAS THERE, B4 PROCEEDING ANEW.
1F31  00                LBUSX:  DB      $00             ;LAST DISPLAYED BUSEX, BUSEY
1F32  00                LBUSY:  DB      $00
1F33  0000              LBASX:  DW      $00             ;LAST DISPLAYED CSTRTX, CSTRTY
1F35  0000              LBASY:  DW      $00
1F37  00                LNUMPT: DB      $00             ;LAST DISPAYED NUMPTS
1F38  00                LSNMPT: DB      $00             ;LAST DISPLAYED SNMPTS
1F39  00                LASTSX: DB      $00         ;LAST X STARTING POSITION USED BY MNITOR ROUTINE
1F3A  00                LASTSY: DB      $00         ;LAST Y ....
1F3B  00                TEMPX:  DB      $00
1F3C  00                TEMPY:  DB      $00         ;X & Y FOR TEMPORARY SUBROUTINE USE (LSTERA)
1F3D  00                TMPNUM DB $00 ;TEMP INDEX
1F3E  00                XCHAR1: DB      $00             ;XCHAR1 & XCHAR2 ARE USED TO HOLD ASCII
1F3F  00                XCHAR2: DB      $00             ;FOR EXTERNAL CALLS.
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1F40  00          CHRHIT: DB      $00             ;HOLDS CHAR HIT FOR CALLER'S BENEFIT
1F41  00          HCOLOR DB $00 ;CURRNT COLOR
1F42  00          HCOLR2: DB        $00       ;CURRENT COLOR ROTATED FOR ODD BYTES
1F43  00          PAGE: DB $00  ;CURRENT GRAPICS PAGE IN USE
1F44  00          USEX DB $00  ;X DISP BEING USED
1F45  00          USEY DB $00  ;Y DISP BEING USED
1F46  00          BUSEX:  DB      $00             ;VECTOR TO BE APPLIED TO BRUSH IF NOT IN
1F47  00          BUSEY:  DB      $00             ;IN LOCATE MODE.
1F48  = 0004      PADFUL: DS      4               ;1-255 RANGE FOR PDLS 1-4.
1F4C  = 0004      PAD18:  DS      4               ;1-8 RANGE FOR PDLS 1-4.
1F50  = 0004      PADVEC: DS      4               ;-4 TO +4 RANGE FOR PDLS 1-4.
1F54  00          CUMODE DB $00  ;CURRENT MODE (LIKE P REGISTER)
                  ;                                ;-1 = MONITOR, 0 = MASTER
1F55  00          HLDMDE: DB      $00             ;HOLD CURRENT MODE
1F56  01          MXMODE: DB      $1               ;0 = GRAPHICS ONLY (FOR MOVIES) 1 = TEXT & GR
1F57  00          TPTR DB $00  ;PTR TO A DISP OF CURRENT TARGET
1F58  00          SPTR DB $00  ;PTR TO A DISP OF CURRENT SOURCE
1F59  00          CURTRG: DB      $00             ;CURRENT TARGET (INTERNAL)
                                                  ;1-8 = PATTERN 1-8
1F5A  00          CTARG:  DB      $00             ;CURRENT TARGET (DISPLAY)
                                                  ;'1' - '8'
1F5B  00          CURSRC: DB      $00             ;CURRENT SOURCE (INTERNAL)
                                                  ; 0 = PDLS 1 &2, 1-8 = PATTERN 1-8.
1F5C  00          CSOURC: DB      $00             ;CURRENT SOURCE (DISPLAY)
                                                  ; 'P', '1' - '8'
1F5D  7F          CSTRTX DB $7F  ;CURRENT STARTING X
1F5E  3F          CSTRTY DB $3F  ;CURRENT STARTING Y
1F5F  00          CCOUNT: DB      $00             ;A DUMMY LOCATION THAT IS INCREMENTED AND
                                                  ;AND-ED OFF TO GET WHICH OF PADDLES (0-3) TO SA
1F60  00          CURCNT: DB $00  ;REFRESH FOR COUNTER
1F61  00          HCOUNT: DB $00  ;CURRENT COUNTER FOR TIMING (= SPEED)
1F62  00          CSPEED: DB      $00             ;CURRENT SPEED (DISPLAY)
                                                  ;'S' = SINGLE STEP, '1' - '8'
1F63  00          SAMFLG: DB      $00             ;STROKE SIZING MODE (INTERNAL)
                                                  ;-1 = NORMAL, 1-4 = PDL 1-4.
1F64  00          DSSFLG: DB      $00             ;STOKE SIZING MODE (DISPLAY)
                                                  ;'N', '1' - '4'
1F65  00          TAMFLG: DB      $00             ;BRUSH SIZING MODE (INTERNAL)
                                                  ;-1 = NORMAL, 1-4 = PDL 1-4.
1F66  00          DSTFLG: DB      $00             ;BRUSH SIZING MODE (DISPLAY)
                                                  ;'N', '1' - '4'
1F67  00          FRZFLG DB $00  ;FREEZE FLAG
1F68  00          DRWFLG DB $00  ;DRAW ENABLE
1F69  00          MEFLAG DB $00  ;MOVE OR ENTER MODE FLAG
1F6A  01          INIFLG: DB      $01             ;INIT FLAG (0=INITIALIZED)
1F6B  00          LOCFLG: DB      $00             ;LOCATE MODE FLAG (INTERNAL & DISPLAY)
1F6C  00          CURLOC: DB      $00             ;LOCATION DEVICE (INTERNAL ONLY)
                                                  ;-1 = KB, 0 = PADDLES 1 & 2
1F6D  00          VISFLG: DB      $00             ;VISUALIZE MODE FLAG (INTERNAL & DISPLAY)
1F6E  00          PNTFLG: DB      $00             ;PAINT MODE FLAG (INTERNAL & DISPLAY)
1F6F  00          BRSFLG: DB      $00             ;BRUSH MODE FLAG (INTERNAL & DISPLAY)
1F70  00          QSTFLG: DB      $00             ;QUICK STROKE MODE (INTERNAL & DISPLAY)
1F71  00          WRPFLG: DB      $00             ;WRAP-AROUND ON/OFF (INTERNAL & DISPLAY)
1F72  00          XNEG:   DB      $00              ;NEGATE SOURCE X VECTOR FLAG
1F73  00          YNEG:   DB      $00
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1F74  00        XCRUISE DB $00  ;LOCK CURRENT X FLAG
1F75  00        YCRUISE DB $00  ;LOCK CURRENT Y FLAG
1F76  00        COLFLG: DB      $00         ;COLOR SELECTION MODE (INTERNAL)
                                            ;0 = KB, 1-4 = PDL 1-4
1F77  00        DSCLFG: DB      $00         ;COLOR SELECTION MODE (DISPLAY)
                                            ;'K', '1' - '4'
1F78  00        CCOLOR: DB      $00         ;CURRENT COLOR BEING DRAWN WITH (INTERNAL).
1F79  00        CLRHLD: DB      $00          ;TEMP STORAGE FOR CURRENT COLOR (1-8)
1F7A  00        BCOLOR: DB      $00         ;CURRENT COLOR SETTING (INTERNAL)
1F7B  00        DSCOLR: DB      $00         ;CURRENT COLOR SETTING (DISPLAY)
1F7C  00        BKCOLR: DB      $00        ;BACKGROUND COLOR (1-8)
1F7D  00        DSBKND: DB      $00         ;BACKGROUND COLOR (DISPLAY)
1F7E  00        TEMP:   DB      $00          ;TEMP STORAGE
1F7F  00        CHGFLG: DB      $00         ;FLAG USED TO INDICATE IF ANY CHANGE WAS
                                            ;INSTITUTED SINCE LAST TIME SOMETHING WAS
                                            ;DISPLAYED THAT WOULD GIVE US REASON TO
                                            ;ERASE THIS LAST THING AND REDISPLAY.
                                            ;0 = NO CHANGE, 1 = CHANGE.
1F80  00        HITTYP: DB      $00         ;HIT TYPE: (1 = KB, 0 = EXTERNAL)
1F81  00        HITFLG: DB      $00          ;0  RESPOND NORMALLY TO KB HITS
                ;                            ;1 RETURN TO CALLER W/CHARACTER IN TMPNUM
                ;                            ;-1 IGNORE ALL KB HITS
1F82  00        TXTFLG: DB      $00          ;0  USE TEXT AREA FOR HELP SCREEN &CONTROLS
                ;                            ;1  DO NOT WRITE IN TEXT AREA
                ;                            ;-1 WRITE IN ONLY 1ST TWO LINES OF CTL DISPLAY
1F83  00        CTXFLG: DB      $00         ;TRACKS STATUS OF 4 LINE CTL DISPLAY
                                            ;0  ALL 4 LINES ARE OK
                                            ;1  NONE OF THE 4 LINES ARE OK
                                            ;-1 TOP 2 OF 4 LINES ARE OK
1F84  00        KBFRCH: DB      $00         ;1 - TURN FREEZE ON AFTER ONE CYCLE FLAG
1F85  00        QSTXEQ: DB      $00         ;1 - EXECUTING QUICK STROKE; 0 - NOTHING
1F86  00        STKFLG: DB      $00         ;1 - UPDATE STROKE BUFFER W/CURRENT VECTOR
1F87  00        OPTR:   DB      $00         ;POINTER TO SOURCE PATTERN
1F88  00        ONMPTS: DB      $00         ;# OF POINTS IN SOURCE PATTERN (INHERENT SIZE)
1F89  00        ORGFLG: DB      $00         ;1 - TELLS LOOP ROUTINES THAT USER WANTS TO
                                            ;    RETURN TO ENTER OR MOVE ORIGIN.
1F8A  00        ORIGX:  DB      $00         ;THE VECTOR THAT WILL GET US BACK TO THE ORIGIN
1F8B  00        ORIGY:  DB      $00
1F8C  7F        PORGX:  DB      127         ;THE LAST SCREEN LOCATION ORIGIN
1F8D  40        PORGY:  DB      64
1F8E  00        EORGX:  DB      $00         ;THE VECTOR THAT WILL GET US BACK TO THE
1F8F  00        EORGY:  DB      $00         ;ORIGIN IN THE PATTERN BEING ENTERED.
1F90  00        SPDHLD: DB      $00         ;HOLD SPEED SETTING WHILE EXECUTING QUICK STROK
1F91  00        TBSPTR: DB      $00         ;BASE POINTER TO LEFT SIDE OF TARGET.
1F92  00        BSPTR:  DB      $00         ;BASE POINTER TO LEFT SIDE OF STROKE BUFFER.
1F93  00        PNMFLG: DB      $00         ;PAINT MODE
1F94  00        PNMIND: DB      $00         ;THE ACTUAL PAINTING MODE
1F95  00        LOCHLD: DB      $00         ;REMEMBER LOCATE MODE STATUS
1F96  00        VISHLD: DB      $00         ;REMEMBER VISUALIZE MODE STATUS
1F97  00        WRPHLD: DB      $00         ;REMEMBER WRAPAROUND STATUS
1F98  00        WRPIND: DB      $00         ;WRAPAROUND FLAG (- = OFF, + = ON)
1F99  0000      SCSTRX: DW      $00         ;SCREEN LOCATION: 10 BITS
1F9B  0000      SCSTRY: DW      $00
1F9D  0000      SDSTRX: DW      $00         ;SCREEN LOCATION FOR DRAWIT ROUTINE
1F9F  0000      SDSTRY: DW      $00
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```
1FA1  00          PTCNT:  DB      $00             ;COUNT OF POINTS WITHIN SCREEN BOUNDS
1FA2  00          OFFLAG: DB      $00             ;OFF SCREEN FLAG.
                                                  ;0 = WE'RE OFF THE SCREEN, PLOT ALL POINTS BUT
                                                  ;    COUNT ONLY THOSE WITHIN SCREEN BOUNDS.
                                                  ;1 = ON (OR JUST OFF) SCREEN, PLOT ONLY THOSE
                                                  ;    POINTS WITHIN SCREEN BOUNDS.
1FA3  00          NUMMSK: DB      $00             ;USED TO OR IN INVERSE VIDEO BIT FOR
                                                  ;SCREEN LOCATION DISPLAY.
1FA4  00          LOCX:   DB      $00             ;HOLD REGISTERS FOR PREVIOUS LOCATE VECTOR
1FA5  00          LOCY:   DB      $00
1FA6  00          DRWHLD: DB      $00             ;HOLD BRUSH UP/DOWN STATUS.
                  ;
                  ;
      = 6600      PATTS:  EQU     $6600
1FA7  0066        APATTS: DW      PATTS
1FA9  0068                DW      PATTS+$200
1FAB  006A                DW      PATTS+$400
1FAD  006C                DW      PATTS+$600
1FAF  006E                DW      PATTS+$800
1FB1  0070                DW      PATTS+$A00
1FB3  0072                DW      PATTS+$C00
1FB5  0074                DW      PATTS+$E00
1FB7  0076                DW      PATTS+$1000
                  ;
      = 7800      EXTTBL: EQU     PATTS+$1200     ;BEGINNING OF TABLE TO SUPPORT
                                                  ;MULTIPLE KB HIT CALLS FROM OUTSIDE
                  ;-----------------------------------------------------------------------
                  ;
1FB9  = 6000              ORG     $6000
      = 6000      YTAB1:  EQU     *0
6000  = 6080              ORG     *0+128
                  ;
                  ;    YTAB1 - CONTAINS HIGH ORDER BYTE OF ROW ADDRESS FOR Y VALUES 0-127.
                  ;            TABLE IS OFFSET BY 16 FOR THE CH50 'FRAME' EFFECT. CHEAP.
                  ;
                  ;
                  ;            THE FOLLOWING EXPRESSION IS BASICALLY REPEATED 128 TIMES
                  ;
                  ; YCOOR:  SET 16 + 127 - (*0-YTAB1)
                  ; YF8:    SET YCOOR AND $F8
                  ;         DB HIGH($2000+(YF8/64)*$28+(YF8)*$10-(YF8/64)*1024+(YCOOR AND $07)*$
                  ;
                  ;-----------------------------------------------------------------------
                  ;
      = 6080      YTAB2:  EQU *0
6080  = 6100              ORG *0+128
                  ;
                  ;    YTAB2 - CONTAINS LOW ORDER BYTE OF ROW ADDRESS FOR Y VALUES 0-127.
                  ;
                  ;            THE FOLLOWING EXPRESSION IS BASICALLY REPEATED 128 TIMES
                  ;
                  ; YCOOR:   SET 16 + 127 - (*0-YTAB2)
                  ; YF8:     SET YCOOR AND $F8
                  ;          DB LOW((YF8/64)*$28+(YF8)*$10-(YF8/64)*1024+(YCOOR AND $07)*$400)
                  ;
```

```
                ;-----------------------------------------------------------------
                ;
     = 6100     XTAB1:  EQU *0
6100 = 6200             ORG *0+256
                ;
                ;    XTAB1 - CONTAINS OFFSET TO SCREEN BYTE ON CURRENT ROW FOR X VALUES
                ;            0-255. IT IS OFFSET BY DECIMAL 11 FOR SCREEN EFFECT.
                ;
                ;            THE FOLLOWING EXPRESSION IS REPEATED 256 TIMES
                ;
                ;          DB ( *0 - XTAB1 + 11)/7
                ;
                ;-----------------------------------------------------------------
                ;
     = 6200     XTAB2:  EQU *0
6200 = 6300             ORG *0+256
                ;
                ;    XTAB2 - CONTAINS APPROPRIATE BIT MASK FOR X VALUES 0-255. ALL BYTES HAVE
                ;            THE COLOR FAMILY BIT SET SO THAT THE AFFECTED BYTE IN CORE WILL
                ;            HAVE ITS COLOR FAMILY CHANGED IF ONE OF ITS BITS IS CHANGED.
                ;
                ;            THE FOLLOWING EXPRESSION IS REPEATED 256 TIMES
                ;
                ;          DB $80 + 1 SHL ( ( *0 - XTAB2 + 11 ) MOD 7 )
                ;
                ;-----------------------------------------------------------------
                ;
                ;
6300 = 6300             ORG $FF00 AND (*0+$FF)
                ;
                ;
     = 6300     JMPTBL: EQU     *0
                ;
6300 570F               DW NONFUN
6302 570F               DW NONFUN
6304 570F               DW NONFUN
6306 6F14               DW      CTRLC    ;CTRL-C ==) FUNCTIONS LIKE RETURN
6308 570F               DW NONFUN
630A 570F               DW NONFUN
630C 570F               DW NONFUN
630E BC11               DW KBLEFT    ;CTRL-G
6310 8A15               DW      LARROW    ;CTRL-H (BACK-ARROW)
6312 570F               DW NONFUN
6314 C311               DW      KBRGHT    ;CTRL-J
6316 570F               DW NONFUN
6318 4F14               DW      LNGEXT
631A DA0C               DW      COMAND    ; (CR), RETURN TO COMMAND MODE
631C D111               DW      KBDWN     ;CTRL-N
631E FA13               DW      TRGALL
6320 570F               DW NONFUN
6322 570F               DW  NONFUN  ;CTRL-Q
6324 BF10               DW      PNPNOF   ;CTRL-R
6326 9364               DW      CPYTXT   ;CTRL-S
6328 A664               DW      CPYTXF   ;CTRL-T
632A 1915               DW      RARROW    ;CTRL-U (FORWARD-ARROW)
```

```
632C 0D10              DW      CHBKND    ;CTRL-V
632E 5D13              DW      SRCMDE
6330 2113              DW      TRGMDE    ;CTRL-X
6332 CA11              DW      KBUP      ;CTRL-Y
6334 3716              DW      MOVROW    ;CTRL-Z
6336 DA0C              DW      COMAND    ; ESCAPE
6338 9013              DW      SRCALL
633A 5B0F              DW      COLMDE
633C BA0F              DW      COLTAB    ; 30
633E 570F              DW NONFUN
6340 8C10              DW FREEZE    ; SPACE
6342 0A16              DW      PNMHIT    ; !
6344 0A16              DW      PNMHIT    ; "
6346 0A16              DW      PNMHIT    ; #
6348 0A16              DW      PNMHIT    ; $
634A 0A16              DW      PNMHIT    ; %
634C 570F              DW NONFUN
634E 570F              DW NONFUN
6350 570F              DW NONFUN
6352 6516              DW      SETQWK    ; )
6354 4314              DW CLRCTR   ; *
6356 0D15              DW      QWIKI2    ; +
6358 9512              DW NEGX     ; ,
635A 1464              DW      COPYBK    ; - ==) COPY HIRES SCREEN 2 TO SCREEN 1
635C DB12              DW NEGY     ; .
635E 6312              DW PDREST   ; /
6360 C414              DW      PGORGE    ; 0
6362 790F              DW      COLCHG    ; 1
6364 790F              DW      COLCHG    ; 2
6366 790F              DW      COLCHG    ; 3
6368 790F              DW      COLCHG    ; 4
636A 790F              DW      COLCHG    ; 5
636C 790F              DW      COLCHG    ; 6
636E 790F              DW COLCHG   ; 7
6370 790F              DW COLCHG   ; 8
6372 9914              DW PSORGE   ; 9
6374 3864              DW      COPYTO    ; : ==) COPY HIRES SCREEN 1 TO SCREEN 2
6376 DD14              DW QWIKIE     ; ;
6378 570F              DW NONFUN   ; <
637A 570F              DW NONFUN
637C 570F              DW NONFUN   ; >
637E 570F              DW NONFUN   ; ?
6380 570F              DW NONFUN   ; @
6382 570F              DW      NONFUN    ; A
6384 ED0F              DW      BLITZ     ; B
6386 0510              DW      CLROLD    ; C
6388 570F              DW      NONFUN    ; D
638A 570F              DW      NONFUN    ; E
638C 570F              DW      NONFUN    ; F
638E BC11              DW      KBLEFT    ; G
6390 D811              DW      KBSTIL    ; H
6392 7B14              DW      ESORGE    ; I
6394 C311              DW      KBRGHT    ; J
6396 570F              DW      NONFUN    ; K
6398 3411              DW      LOCHIT    ; L
```

```
639A  4610              DW      SWMODE    ; M
639C  D111              DW      KBDWN     ; N
639E  AD14              DW      EGORGE    ; O
63A0  A910              DW      PNTHIT    ; P
63A2  0E11              DW      QSTHIT    ; Q
63A4  F30F              DW      RABBIT    ; R
63A6  FF0F              DW      SNAIL     ; S
63A8  F90F              DW      TURTLE    ; T
63AA  7610              DW      DRAWON    ; U
63AC  CD10              DW      VERHIT    ; V
63AE  E510              DW      WRPHIT    ; W
63B0  7F12              DW      HOLDY     ; X
63B2  CA11              DW      KBUP      ; Y
63B4  6912              DW      HOLDX     ; Z
63B6  570F              DW NONFUN   ; SQ (
63B8  570F              DW NONFUN   ; BCK /
63BA  570F              DW NONFUN   ; SQ )
63BC  570F              DW NONFUN   ; ^
63BE  570F              DW NONFUN   ; (
63C0  570F              DW NONFUN   ; '
63C2  = 6400            ORG     $FF00 AND (*0+$FF)
                ;
                ;
                ; CCPYBK & CCPYTO - COPY FROM & TO HIRES PAGE 2: EXTERNAL CALL
                ;                   INDEPENDENT OF PP.
                ; ------------------------------------------------------------
                ;
6400  205B64    CCPYBK: JSR     SAVREG
6403  201464            JSR     COPYBK
6406  206D64            JSR     RSTREG
6409  60                RTS
                ;
640A  205B64    CCPYTO: JSR     SAVREG
640D  203864            JSR     COPYTO
6410  206D64            JSR     RSTREG
6413  60                RTS
                ;
                ;    COPYBK & COPYTO - COPY FROM & TO HIRES PAGE 2
                ;    ---------------------------------------------
                ;
6414  206E1C    COPYBK: JSR     LSTERA
6417  A920              LDA     #$20
6419  8563              STA     TO+1
641B  A940              LDA     #$40
641D  8561              STA     FROM+1
641F  A000              LDY     #$0
6421  8462              STY     TO
6423  8460              STY     FROM
6425  B160    COPYBL: LDA     [FROM],Y
6427  9162              STA     [TO],Y
6429  C8                INY
642A  D0F9 ^6425          BNE     COPYBL
642C  E661              INC     FROM+1
642E  E663              INC     TO+1
6430  A561              LDA     FROM+1
```

```
6432 C960            CMP    #$60          ;REACHED END OF GRAPHICS PAGE YET?
6434 D0EF ^6425      BNE    COPYBL
6436 60              RTS
                ;
6437 AD              DB     $AD ;==FLAK
                ;
6438 206E1C     COPYTO: JSR    LSTERA
643B A920            LDA    #$20
643D 8561            STA    FROM+1
643F A940            LDA    #$40
6441 8563            STA    TO+1
6443 A000            LDY    #$0
6445 8462            STY    TO
6447 8460            STY    FROM
6449 B160       COPYTL: LDA    [FROM],Y
644B 9162            STA    [TO],Y
644D C8              INY
644E D0F9 ^6449      BNE    COPYTL
6450 E661            INC    FROM+1
6452 E663            INC    TO+1
6454 A563            LDA    TO+1
6456 C960            CMP    #$60          ;REACHED END OF GRAPHICS PAGE YET?
6458 D0EF ^6449      BNE    COPYTL
645A 60              RTS
                ;
                ;
                ;    SAVREG & RSTREG - SAVE/RESTORE ZERO PAGE LOCATIONS.
                ;    ---------------------------------------------------
                ;
645B 204AFF     SAVREG: JSR    IOSAVE        ;SAVE 6502 REGISTERS
645E A218            LDX    #$18
6460 A000            LDY    #$0
6462 B96000     SAVLOP: LDA    FROM,Y
6465 99E803          STA    REGS,Y
6468 C8              INY
6469 CA              DEX
646A D0F6 ^6462      BNE    SAVLOP
646C 60              RTS
                ;
646D A218       RSTREG: LDX    #$18
646F A000            LDY    #$0
6471 B9E803     RSTLOP: LDA    REGS,Y
6474 996000          STA    FROM,Y
6477 C8              INY
6478 CA              DEX
6479 D0F6 ^6471      BNE    RSTLOP
647B 203FFF          JSR    IOREST        ;RESTORE 6502 REGISTERS
647E 60              RTS
                ;
                ; CCPTXT & CCPTXF - COPY TEXT TO AND FROM TEXT PAGE 2. THESE ARE CALLED
                ;                   EXTERNALLY, INDEPENDENT OF PAINTER POWER.
                ;-------------------------------------------------------------------
                ;
647F 205B64     CCPTXT: JSR    SAVREG
6482 209B64          JSR    CPYTOK
```

```
6485  206D64            JSR     RSTREG
6488  60                RTS
                ;
6489  205B64    CCPTXF: JSR     SAVREG
648C  20AB64            JSR     CPYFOK
648F  206D64            JSR     RSTREG
6492  60                RTS
                ;
                ; CPYTXT & CPYTXF - COPY TEXT TO AND FROM TEXT PAGE 2.
                ; ---------------------------------------------------
                ;
6493  AD801F    CPYTXT: LDA     HITTYP
6496  F003 ^649B        BEQ     CPYTOK
6498  4CD064            JMP     SOUND
649B  A904      CPYTOK: LDA     #4              ;COPY TEXT PAGE 1 ==) TEXT PAGE 2
649D  8561              STA     FROM+1
649F  A908              LDA     #8
64A1  8563              STA     TO+1
64A3  4CB364            JMP     DOCPY
                ;
64A6  AD801F    CPYTXF: LDA     HITTYP
64A9  D0ED ^6498        BNE     CPYTXT+5
64AB  A908      CPYFOK: LDA     #8              ;COPY TEXT PAGE 2 ==) TEXT PAGE 1
64AD  8561              STA     FROM+1
64AF  A904              LDA     #4
64B1  8563              STA     TO+1
64B3  A904      DOCPY:  LDA     #4
64B5  8DCF64            STA     TMPCPY
64B8  A000              LDY     #0
64BA  8460              STY     FROM
64BC  8462              STY     TO
64BE  B160      CPYTXL: LDA     [FROM],Y
64C0  9162              STA     [TO],Y
64C2  C8                INY
64C3  D0F9 ^64BE        BNE     CPYTXL
64C5  E661              INC     FROM+1
64C7  E663              INC     TO+1
64C9  CECF64            DEC     TMPCPY
64CC  D0F0 ^64BE        BNE     CPYTXL
64CE  60                RTS
                ;
64CF  00        TMPCPY: DB      0               ;KEEP THIS SEPARATE FROM PP REGISTERS.
                ;
                ;
                ; SOUND - BELCH AT THE USER: THEY HIT A BAD CHARACTER.
                ; ----------------------------------------------------
                ;
64D0  A010      SOUND:  LDY     #$10
64D2  A240              LDX     #$40
64D4  20E564            JSR     SOUNDZ
64D7  60                RTS
                ;
                ;
                ;
                ; SOUND2 - VISUALIZE KB PRESS WITH A TICK.
```

```
                ; ---------------------------------
                ;
64D8  A930      SOUND2: LDA     #$30            ;DELAY A LOT SO THAT NOISE OF KEY PRESS IS
64DA  20A8FC            JSR     ADELAY          ;MOSTLY OVER BEFORE TICK SOUNDS.
64DD  A005              LDY     #$05
64DF  A20D              LDX     #$0D
64E1  20E564            JSR     SOUNDZ
64E4  60                RTS
                ;
                ; SOUNDZ - GENERAL SOUNDER: X = FREQ, Y = DURATION
                ; ---------------------------------------------------
                ;
64E5  A940      SOUNDZ: LDA     #$40
64E7  20A8FC            JSR     ADELAY
64EA  8A        SNDZLP: TXA                     ;GET FREQUENCY
64EB  20A8FC            JSR     ADELAY
64EE  AD30C0            LDA     SPEAK
64F1  88                DEY
64F2  D0F6 ^64EA        BNE     SNDZLP
64F4  60                RTS
                ;
64F5  = 6500            ORG     $FF00 AND (*0+$FF)
                ;
      = 6500    LSTBYT: EQU     *0              ;AREA TO STORE HIRES SCREEN BYTES TO BE RESTORE
                ;
6500            ENDCH: END
```

no ERRORs, 527 Labels, 7B40h bytes not used. Program LWA = 6500h.

```
   ACLOOK 1F10   10/50   46#23
   ADDVEC 0E41    7/26    7/32    7#37
   ADELAY FCA8    1#29   32/18   55/ 4   55/14   55/16
   ADVNM1 1694   28/32   28#34
   ADVNM2 16B5   28/46   28#48
   ADVNOC 16CF   28/56   29# 3
   APATTS 1FA7    3/32    3/34   21/45   21/48   22/33   22/36   30/41
                 30/44   49#15
   APLEXT 18C8   32/53   33/24   33/33   33/36   33/42   33#48
   APLNL2 1874   33/10   33#12
   APLNLO 18A8   33/19   33/21   33#35
   APLNP1 1835   32/36   32#43
   APLNP2 1844   32/44   32#49
   APLNPD 181F   32/27   32#35
   APLNQS 1885   32/50   33/16   33#18
   APLNVI 186C   33/ 7   33# 9
   APLOC  1806    6/29   32#26
   APLOK1 1816   32/30   32#32
   APLOK2 182F   32/39   32#41
   APLXON 18B8   33/38   33#41
   ARBUZZ 1587   25/ 4   25/23   25/42   25#55   26/ 8   26/23   26/34
   ARCHEK 15E9   25/53   26#45
```

```
   BASDEX 1B82   38/ 5   38/ 8   38#37
   BASDF  1B32   29/19   37/51   37/54   38/ 2   38# 6
   BASDSP 1B12    6/45   29/ 3   37#49
   BASH   0029    1#35   27/43
   BASL   0028    1#34   27/41   27/50
   BASXIN 1B4A   38/12   38/14   38#16
   BASYIN 1B71   38/27   38/29   38#31
   BASYOT 1B6A   38/25   38#28
   BBASEX 0074    1#53   21/33   25/10   26/10   28/ 9   30/42   30/45
                 34/11   35/32   35/43   35/47
   BBASEY 0076    1#54   25/14   26/12   28/13   30/43   30/47   34/13
                 35/34   35/49   35/53
   BCOLOR 1F7A   10/11   10/18   16/ 6   29/45   48# 9
 n BEGIN  0C00    2#35
   BKCOLR 1F7C   11/42   12/10   12/15   48#11
   BKLOOP 1D86   43#49   43/55   44/ 4
   BLITZ  0FED   11#23   24/29   51/45
 n BRSFLG 1F6F   47#51
   BSPTR  1F92    2/50   14/42   24/35   25/ 3   25/ 6   26/ 5   26/ 9
                 28/16   32/38   32/40   33/ 4   35/40   35/45   35/51
                 36/ 2   38/44   48#45
   BUSEX  1F46   17/12   18/55   18/56   33/40   35/ 4   35/ 8   35/26
                 35/31   37/34   37/42   47# 7
   BUSEY  1F47   17/13   19/33   19/34   33/47   35/ 7   35/10   35/27
                 35/33   37/33   37/41   47# 8
   CBASEX 0070    1#51   35/46   35/48   36/14   36/16   41/44   43/17
   CBASEY 0072    1#52   35/52   35/54   36/20   36/22   41/39   43/ 6
   CCOLOR 1F78   10/24   48# 7
   CCOUNT 1F5F    6/25    6/26   47#28
 n CCPTXF 6489   54# 4
 n CCPTXT 647F   53#54
 n CCPYBK 6400   52#28
 n CCPYTO 640A   52#33
   CGPNOF 0FB8   10/17   10#38
   CHBKND 100D    3/23   11#52   50/56
   CHBMAS 1042   12/19   12#22
   CHBOK  1015   11/53   11#55
   CHGFLG 1F7F    6/37    6/44    8/54   28/42   36/ 7   36/30   41/51
                 48#14
   CHRHIT 1F40    5/40    5/50   46#56
   CLRCTR 1443   22#48   51/21
 n CLRHLD 1F79   48# 8
   CLROLD 1005   11#42   51/46
   CNTOVR 0DD8    6/36    6#48
   COLCH2 0F99   10#23   12/16   15/29   15/34   16/ 7
   COLCHG 0F79    3/25   10# 5   51/28   51/29   51/30   51/31   51/32
                 51/33   51/34   51/35
   COLCKB 0F82   10/ 6   10#10   32/48
   COLFLG 1F76    9/51    9/54   10/ 5   32/43   48# 3
   COLMDE 0F5B    3/20    9#43   51/ 8
   COLMNK 0F73    9/49    9#53
   COLMOK 0F63    9/44    9#46
   COLORS 1F08   10/26   46#15
   COLTAB 0FBA    4/ 7   10#45   51/ 9
   COLTOK 0FC2   10/46   10#48
```

```
   COMAND 0CDA    4#21   23/18   50/47   51/ 6
   COPYBK 6414   15/53   51/24   52/29   52#41
   COPYBL 6425   52#49   52/52   53/ 2
   COPYTL 6449   53#15   53/18   53/23
   COPYTO 6438   15/27   51/37   52/34   53# 7
   COUT1  FDF0    1#28   37/ 4   37/17
   CPAGE1 0064    1#44   31/15   31/32   31/36   39/49   39/55   40/39
                 40/51   41/ 7
   CPAGE2 0066    1#45   31/24   31/34   31/37
   CPYFOK 64AB   54/ 5   54#23
   CPYTOK 649B   53/55   54/13   54#15
   CPYTXF 64A6   50/54   54#21
   CPYTXL 64BE   54#32   54/35   54/39
   CPYTXT 6493   50/53   54#12   54/22
   CSOURC 1F5C    3/29   21/ 6   47#24
   CSPEED 1F62    9/ 8   11/ 5   24/27   47#32
   CSTRTX 1F5D    2/52   23/41   24/11   28/50   47#26
   CSTRTY 1F5E    2/55   23/43   24/14   28/37   47#27
   CTARG  1F5A    3/27   22/12   47#20
   CTRLC  146F   23#17   50/37
   CTXFLG 1F83   23/11   36/41   48#26
   CUMODE 1F54    2/46    8/41   10/16   12/12   13/22   14/26   15/25
                 15/32   15/50   15/55   27/16   47#12
   CURCNT 1F60    6/48   11/12   47#30
   CURLOC 1F6C   16/41   17/53   18/40   19/18   33/20   47#47
   CURPTS 1F2F   36/ 3   36/26   42/18   43/ 2   43/35   46#40
   CURSET FC22    1#33   27/40   27/47   36/55   37/13
   CURSRC 1F5B   18/49   19/27   20/36   21/10   21/25   30/50   33/35
                 34/31   35/24   47#22
   CURSRX 0024    1#25   27/39   36/52   37/10
   CURSRY 0025    1#26   27/37   27/46   36/54   37/12
   CURTRG 1F59   22/29   30/53   47#18
   D1WRNO 17B8   31/13   31#17   31/22
   DCBYTE 1C1C   38/21   38/36   38/52   39/13   39/27   39/34   40#21
   DCLOOK 1F18   10/52   32/47   46#24
   DCNCC1 1C38   40/32   40#35
   DCNDIG 1C6C   40/24   41# 9
   DCOUT1 1C3E   40/34   40#37
   DCOUT2 1C54   40/46   40#49
   DCOUT3 1C68   41/ 3   41# 6
   DCSUB1 1C30   40#30   40/36
   DCSUB2 1C4B   40#44   40/48
   DCSUB3 1C5F   40#56   41/ 5
   DECR1  0DFE    7/ 4    7# 9
   DECR2  0E01    7/ 2    7#10
   DECR3  0E04    6/55    7#11
 n DGRAPH C050    1#19
 n DHIRES C057    1#18
   DLOOP  1CF4   42#33   43/27
   DOBKND 101F   11/43   12/ 2   12# 9
   DOCPY  64B3   54/19   54#27
   DOFLG1 16E1   29/15   29#18
   DOFLG2 170E   29/14   29#36
   DOFLGS 16D3    4/15   29#11   30/26
   DOFNNN 16E0   29/13   29#16
```

```
   DOFTP2 16DD    29/12   29#15
   DOINI  0C07     2/37    2#39
   DONDRW 1D63    42/20   43/ 3   43#28
   DONER0 1CB8    41/18   41#52
   DONERA 1CAD    41/36   41#47
   DONERX 1CAE    41/20   41#48
   DONEXT 0D44     5/26    5#32
n  DONXYP 1BEE    39#35
   DPAGE1 17AC    13/28   13/44   13/51   14/ 9   15/18   29/24   29/27
                  29/30   29/33   31#10
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UPDSPD 0FD4 11# 5 11/24 11/27 11/31 11/35 33/14
UPMODE 1069 12/41 12#43
UPSNTS 0FDD 11/ 7 11# 9
USEDEX 1B11 37/38 37#47
USEDF 1AFB 29/18 37/36 37#39
USEDSP 1AEB 35/42 36/10 37#33
USEX 1F44 7/37 7/43 8/ 3 8/24 15/ 4 15/11 17/ 5
17/29 18/43 18/44 33/27 34/12 34/20 35/ 9
47# 5
USEY 1F45 7/39 7/44 8/ 6 8/16 8/28 15/ 6 15/13
17/ 9 17/30 19/21 19/22 33/32 34/14 34/22
35/11 47# 6
VERHIT 10CD 14# 2 52/10
VERHPT 10D2 14# 4 33/ 8
VEROFF 10D7 3/53 4/22 14/ 3 14# 6 23/ 8 24/23
VERUPD 10D9 14/ 5 14# 7
VISFLG 1F6D 7/29 8/45 14/ 2 14/ 7 23/28 24/21 24/56
26/ 3 29/22 35/20 47#49
VISHLD 1F96 24/22 33/ 6 48#49
WARPOF 1CC4 42/ 4 42# 8
WRAPAT 1CB9 14/31 15/40 16/ 5 42# 3
WRCTL1 1A18 36/45 36#51
WRCTL2 1A32 36/44 37# 9
WRDN1 1A31 37/ 2 37# 7

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    WRDN2  1A4B    37/15   37#20
    WRNONE 1A17    36/43   36#46
    WRPEXT 110D    14/27   14#32
    WRPFLG 1F71    14/16   14/23   14/28   16/ 3   29/52   47#53
    WRPHIT 10E5    14#16   52/11
  n WRPHLD 1F97    48#50
    WRPIND 1F98    14/29   15/39   16/ 4   28/55   42/ 3   48#51
    WRPOFF 10F2    14/17   14#22
    WRPON  10EA     3/54   14#18
    WRPUPD 10F4    14/21   14#23
    WRTEXT 1A04     3/ 3   30/24   36#39
    WRTLP1 1A23    36#56   37/ 6
    WRTLP2 1A3D    37#14   37/19
    WRTOP2 1A14    36/42   36#45
    XCHAR1 1F3E     3/12    3/15    3/19    3/22    4/ 4    9/46   10/49
                   11/55   19/54   20/30   21/ 5   22/11   27/36   30/37
                   30/56   33/13   46#54
    XCHAR2 1F3F     4/ 6   10/48   27/45   46#55
    XCRUIS 1F74    16/44   18/ 5   18/10   18/47   29/39   33/37   35/ 2
                   47#56
    XNEG   1F72    19/ 3   19/ 8   29/55   34/45   47#54
    XNEGOF 12C7     3/50   19# 5   21/26
    XTAB1  6100    44/20   50# 3
    XTAB2  6200    44/33   44/39   50#15
    XTRNOF 1273     3/45   18/ 6   18# 9
    XUPMDE 1275    18/ 8   18#10
    XYEXT  1BEF    39/19   39#36
    XYPRI  1BC9    37/46   39#16
    YCRUIS 1F75    16/47   18/21   18/26   19/25   29/42   33/41   35/ 5
                   48# 2
    YESHIT 0D5C     5/44    5#47
    YESOK  0D72     5/53    5#55
    YNEG   1F73    19/36   19/41   30/ 3   34/51   47#55
    YNEGOF 130D     3/51   19#38   21/27
    YTAB1  6000    44/16   49#30
    YTAB2  6080    44/18   49#45
    YTRNOF 1289     3/46   18/22   18#25
    YUPMDE 128B    18/24   18#26
0
    YTAB2  6080
```